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INDUSTRIAL WORLD

Published Weekly in the Interest of Iron, Steel, Coke and Allied Industries.

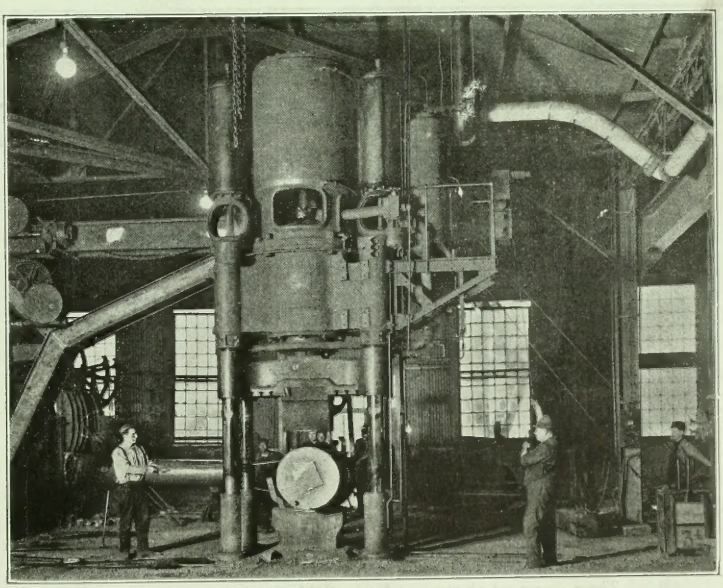
46th Year. No. 2. PITTSBURGH, PA. MONDAY, JANUARY 8, 1912

MESTA MACHINE CO.

PITTSBURGH, PA.

Steam Hydraulic Forging Presses

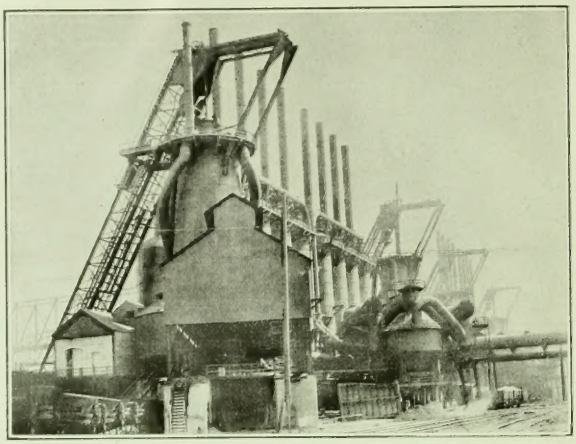
(HANIEL & LUEG PATENTS)



Forging Shop View in Mesta Works Showing 800-ton Press in Operation on 30-inch Ingot.

Note the economy of floor space and ease with which large work is handled. We build these Presses with single frame, from 100 ton to 300 ton capacity, and with four columns from 400 ton to 15,000 ton capacity. Efficient and economical for Mill use or Forging Plants.

Index to Advertisers, Page xx. Classified Index Pages xxi, xxii, xxiii, xxiv, xv, xxvi xxvii.



Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

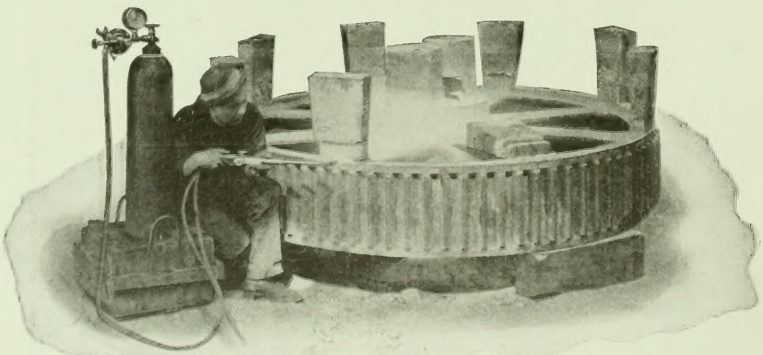
OXY-ACETYLENE

WELDING & CUTTING

APPARATUS

EFFICIENT

ECONOMICAL



SIMPLE

RELIABLE

Cutting risers from machine moulded gear at the Works of the Mesta Machine Company. These Risers which measured 4 in. x 8 in. were removed with the "UNIVERSAL CUTTER" in 1½ minutes each.

THE LINDE AIR PRODUCTS CO.

Head Office and Works: BUFFALO, N. Y.

INDUSTRIAL WORLD

Publication Office, 108 Smithfield Street, Pittsburgh, Pa. Bell, 3909 Court. Ten Cents Per Copy—$3.00 Per Year.

FORTY-SIXTH YEAR. PITTSBURGH, PA., JANUARY 8, 1912. NUMBER TWO.

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Summary of General Iron and Steel Markets

PIG IRON.—Activity in the basic iron market in Pittsburgh district has not yet brought out higher price levels in that grade. Foundry iron in Valleys territory is much firmer, though $13 at furnace still can be done. The old minimum of $10 Birmingham is practically withdrawn on Southern iron. Western pig iron demand dull. Considerable business in Bessemer, malleable and forge pending in Philadelphia territory.

CRUDE STEEL.—Forging billets advance to $28, Pittsburgh mill. Rolling billets firmer, but large producers continue to quote $20; sheets bars, $21. Eastern locomotive interest is understood to have taken 15,000 forging billets from Pittsburgh mill.

COKE.—Spot furnace coke is quoted at $1.70, oven; contracts show range of $1.70 to $1.75, first half.

PLATES, SHAPES, BARS.—Absolute minimum 1.15c, Pittsburgh mill; local producers quote only for limited deliveries. Chicago quoting strictly Pittsburgh base, 1.33c delivered Chicago for prompt shipment, 1.38c on contract.

PIPE.—Discounts on standard sizes unchanged; sweeping reduction on boiler tubes by principal producers, new quotations showing concessions of $5 from December figures.

Line pipe buying from National Tube Company includes 125 miles of 12-inch on California contract.

WIRE.—Prices unchanged; shipments increase with opening of year. Quotations stand for 60 days at least.

BAR IRON.—Demand heavier; prices range from 1.25c to 1.30c, with all capacity in Pittsburgh in operation.

Points on the Market

Rail Tonnages Pending.—Pennsylvania and New York Central still are hanging fire with their rail specifications, and some steel experts are inclined to revise their original estimates as to tonnages these lines will call for. It is asserted Pennsylvania's estimate for first half of the year may be revised downward. Many of the car orders placed by the railroads were not released until after the first of the year, and there is some difference of opinion as to the rate the railroads propose specifying on them.

Hell Gate Bridge.—Second contract on structural tonnage for Hell Gate Bridge, New York, 40,000 tons, was formally awarded to McClintic-Marshall Construction Company and will be rolled by Jones & Laughlin Steel Company. The first contract on the bridge, 35,000 tons, was awarded to the American Bridge Company, and the steel will be rolled by the Carnegie Steel Company.

December Pig Iron Averages.—Official average prices on pig iron for month of December, based on flat sales of 1,000 tons or over, are: Bessemer, $14.19, Valley furnace, compared with $14.01, Valleys, for November; basic, $12.44, Valleys, compared with $12.27, Valleys, for November.

Scrap Sales.—Scrap sales in Pittsburgh during the week included 8,000 tons of heavy melting steel to two steel interests. Heavy melting scrap is firm at $12.75, with some holders asking $13.

More Coke Capacity.—Active coke capacity in the Connellsville region was increased during the week by the putting in service of 2,000 idle ovens, 1,500 of them by the Steel Corporation.

Furnace Operations.—With the putting in blast of Sharon (Pa.) furnace on January 4, Carnegie Steel Company's active furnaces number 41 out of 59.

Southern Iron for Export.—Republic Iron & Steel Company announces shipment 10,000 tons pig iron from its Alabama furnaces for export, at current prices.

PREPARE FOR OPEN HEARTH ADDITION AT HISTORIC EDGAR THOMSON MILLS.

CARNEGIE COMPANY PURCHASES ADDITIONAL PROPERTY AT BRADDOCK PREPARATORY TO REVIVING PLANS FIRST PREPARED TWO YEARS AGO.

The announcement of the purchase of additional real estate to add to the site of the Edgar Thomson plant of the Carnegie Steel Company, at Braddock, Pa., last week, revived discussion as to pending improvements at the Edgar Thomson plant.

Following action by the directors of the Steel Corporation, in New York, in appropriating $7,000,000 for plant improvements, the Carnegie Company purchased two pieces of property along the Union Railroad, to allow for additional mill expansion. Only one more parcel is needed to give the Edgar Thomson a strip of land about 400 feet wide and nearly a mile long, along the Union Railroad.

The engineering layout for the extensions to the Edgar Thomson plant, as planned a year and a half ago, contemplated the moving of the Union railroad tracks further from the plant, the viaducting of Turtle Creek and the utilization of this ground for the new open hearth furnaces, with which it is designed to equip Edgar Thomson.

This work of changing the famous Edgar Thomson plant from Bessemer steel to open hearth would have been begun over a year ago had not the adverse business conditions of the early part of 1911 intervened. The plans, which are ready to be authorized at any time, call for 24 open hearth furnaces, of 50- to 60-ton capacity.

Open hearth rails are being rolled at the Edgar Thomson, but with cold steel from the Homestead open hearth department across the river, which is not economical practice and is admitted to be only a make-shift. Ever since the removal of the splice-bar department of the Carnegie Company to Homestead, over a year ago, the original rail mills, the finest in the country at the time they were installed, have been greatly crowded for room, and the plan for the reconstruction of the plant involves a new layout for the rail mills.

An additional reason for the purchase of the additional land at North Braddock it has been the purpose of the Carnegie Steel Company to remove its Slick carwheel plant from Homestead to the Edgar Thomson plant, where it is designed to centralize, eventually, all the Carnegie Steel Company's carwheel activities, including the old Schoen wheel plant at McKees Rocks. The Slick wheel plant is located at the upper end of the Homestead works. Its output is by no means limited to carwheels, a large proportion of the product shipped from that point being gear blanks and gas engine fly-wheels. The plant is cramped for room, being still in the temporary quarters originally designed for the experimental plant at which the Slick wheel was developed. Additional equipment has been ordered for this branch of the Carnegie Company's activities, which will still further cramp the Homestead mills.

At the time the Steel Corporation was attacked by the government in the courts, last November, the prediction was made that the Carnegie Steel Company would take no further action on these pending improvements at Braddock until the dissolution litigation was settled. However, present developments are taken to mean that the company may proceed with its program at Edgar Thomson, just as other Steel Corporation subsidiaries are doing at Gary and Duluth.

Carnegie Warehouse at Baltimore.

With the opening of the new year, the Carnegie Steel Company closed a deal for the purchase of the plant of the Baltimore Bridge Company of Baltimore, Md., a company which in the past has constructed county bridges. The property was purchased for warehouse purposes. The bill of sale, filed in the Baltimore bill names as a consideration $5; the realty which changes hands in the transaction is valued at about $400,000. The bill of sale enumerates tools, implements, machinery and personal property located at Wicoma and Bush streets. There are seven steel buildings, three brick buildings and 11 acres of ground.

The bridge company has been in existence for seven years, before which the plant was operated by the Standard Steel & Iron Company.

The purchase is merely another step in the pursuance of the Carnegie Company's policy to establish its own warehouses in the larger centers, through which its products may be distributed direct—the Waverly warehouse being the first of these, and the Pittsburgh and Cleveland warehouses later acquisitions to the claim.

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EQUIPMENT NEWS

Direct Drive for Tin Plate Mill.

The Washington Tin Plate Company, of Washington, Pa., has placed an order with the Westinghouse Electric & Manufacturing Company, for a total of 16 induction motors and a motor generator set, aggregating 255 horsepower, for use in the tin house.

The original installation in the mill was made several years ago, and consisted of Westinghouse motors of various capacities.

The new motors will be distributed as follows: Two branders and dusters, 25 horsepower each; six five horsepower motors on the doubling shears, and two five horsepower motors on the squaring shears; one 20 horsepower on the knife grinder for grinding the shear knives; one 10 horsepower on the roll lathe, and two spares consisting of one 20 and one five horsepower motor.

A 75 horsepower motor generator set for supplying direct current to some of the motors throughout the plant is also included in the order. The motors are the CCL induction type, wound for 220 volts.

Contract for Rochester (N. Y.) Building

John L. Mullen, constructing engineer, Union Bank building, Pittsburgh, has received the contract for the erection of structural steel work for a 16-story office building for the Eastman Kodak Company, of Rochester, New York. The contract calls for approximately 1,600 tons of steel.

Steam Trap Equipment.

The M'Auley Automatic Steam Trap Company, Pittsburgh, has received a contract for the steam trap equipment of the American Sheet & Tin Plate Company's plant at Chester, W. Va. Other orders taken during December include equipment for the Pittsburgh Pipe & Equipment Company; Cambria Steel Company, Johnstown, Pa.; Louisville & Nashville Railroad shops at Louisville; Carnegie Steel Company works at Homestead and Mingo Junction; West Virginia Pulp & Paper Company, Piedmont, W. Va.; Richardson Paper Company, Lockland, Ohio; Pennsylvania Railroad Company's shops at Pitcairn, Pa., and at Logansport, Ind.

Shenango Mills Operating.

The Greer mills of the American Sheet & Tin Plate Company at New Castle, Pa., resumed in full January 3. The entire 50 hot mills in the Greer and Shenango tin plants are in operation.

DOWN-RIVER TIN PLATE MERGER: POPE AND PHILLIPS INTERESTS TO UNITE.

INCORPORATION PAPERS FOR CONSOLIDATION, WITH PLANTS AT STEUBENVILLE, O., CLARKSBURG AND WEIRTON, W. VA., SOON TO BE FILED.

It was announced on good authority at Steubenville, O., last week, although not officially confirmed, that the Phillips Sheet & Tin Plate Company, operating plants at Clarksburg and Weirton, W. Va., has purchased the controlling interest in the Pope Tin Plate Company, at Steubenville here and a merger of the two companies will be announced later in the month.

The principal interest in the Pope Tin Plate Company has been held by Charles E. Pope, of Pittsburgh. The company is capitalized at $750,000, and its funded debt is negligible. No statement is forthcoming from Mr. Pope.

The merged concern will have a capacity at its three plants of 44 mills—which will be the largest independent sheet and tin plate interest in the country. This capacity is divided as follows:

	Hot Mills Tin	Sheet
Pope plant, Steubenville	12	..
Phillips plant, Clarksburg	12	..
Phillips plant, Weirton	10	10
Total	34	10

It is said to be the intention of the projectors to increase the capitalization and completely reorganize the business policy of the concerns, formulating an aggressive campaign.

The Pope Tin Plate Company was formed in 1901 about the time the United States Steel Corporation was formed, and made its first production in July, 1902, declaring its first dividend, 1½ per cent, March 23, 1905. It has a thoroughly modern plant of 12 tin mills at Steubenville, O., the entire plant having been built at one time, as a unit.

The Phillips Sheet & Tin Plate Company was formed early in 1905 by James R. Phillips, who had been district manager of the American Sheet & Tin Plate Company, backed by the E. W. Mudge and other Pittsburgh interests, and purchased the plant at Clarksburg, W. Va., which had been built by the Jackson Iron & Tin Plate Company. Mr. Phillips was killed in a railroad accident shortly after the formation of the company, but operations were continued, the Clarksburg plant being entirely rebuilt, and afterward enlarged, while recently an entirely new plant was built at Weirton, W. Va., a short distance down the river from the Chester (W. Va.) plant of the American Sheet & Tin Plate Company.

YOUNGSTOWN CONTRACTS.

Additional Improvements Scheduled by Republic and Sheet & Tube Company.

It is announced at Youngstown that the Republic Iron & Steel Company is planning to increase the capacity of its butt weld pipe department 33 per cent by the erection of an additional butt weld mill at the Lansingville tube works. Plans for the improvement are being prepared in the engineering department.

When the Lansingville tube plant was erected two lap weld pipe mills and two butt weld departments were installed. The additional steel supply manufactured, following the erection of the Lansingville open hearth plant and improvements made at the Bessemer works, together with a constant increase in orders for steel pipe, has resulted in the corporation making an appropriation for an additional butt weld mill at the tube works. No time has been fixed for letting the contracts or for installing the new machinery.

Open Hearth Contract.

Contracts were let on December 30 by the Youngstown Sheet & Tube Company for the iron work for the open hearth furnaces and the soaking pits to be constructed at East Youngstown and also for the riveted steel pipe to be used in connection with a gas producers at the open hearth furnaces and soaking pits.

The W. B. Pollock Company, of Youngstown, was awarded the contracts for the six open hearth furnaces and for the five soaking pits. The open hearth furnace stacks will be 160 feet by 7 feet, 9 inches and the soaking pit stacks 95 feet by 5½ feet.

The Variety Iron Company, of Cleveland, was given the contract for the riveted steel pipe.

Carbon Iron Company Bonds.

Efforts are being made by the Carbon Iron Company through its president, Charles McKnight, of the Bank of Western Pennsylvania, Pittsburgh, to locate the owners of the first and second mortgage bonds of that corporation, issued April, 1892 and due April, 1912. All holders have been requested to communicate with Mr. McKnight at 901 Penn avenue, giving address and number of bonds held.

CRANE CONTRACT AT PANAMA.

Letting Goes to Industrial Works, at Bay City, Mich.

Award has been authorized by the Isthmian Canal Commission to the Industrial Works of Bay City, Mich., of a contract for four locomotive cranes which will be used in the erection of machinery in the lock. The total price for the cranes with auxiliary hooks and lines is $31,500. No award was made for the stiff-leg derricks, for which bids were were requested in the same circular with the cranes.

The cranes required are 15-ton class, capable of handling 8,000 pounds at a 40-foot radius when the outriggers are not in use, and 30,000 pounds at 15-foot radius.

Progress on Lock Gates.

Chairman Goethals' report for the month ending December 15 gives these figures on the steel work for the lock gates at Panama, being fabricated and erected by the McClintic-Marshal Construction Company, Pittsburgh:

Shop Work in U. S.—Up to November 20, a total of 39,812 tons of structural steel had been accepted at the rolling mills, or about 80 per cent of the total, of which 4,128 tons were rolled between October 20 and November 20, and a total of 23,311 tons of riveted structural material was shipped from Rankin shops, or about 46 per cent of the total contract weight. Of this last item, 3,037 tons were shipped between October 20 and November 20. In addition to this, a considerable tonnage of castings has been shipped; also about 20 per cent of the pipes for the pumping system, as well as the hand-railings for leaves Nos. 29 to 40 inclusive, 50 to 58 inclusive, and 52 to 65 inclusive.

Lock Erection.—Four leaves for upper guard gates at Gatun, 54 feet 8 inches high were practically erected and interior riveting was completed on October 1. The work on these leaves during the month of November consisted mainly of bolting up, reaming and riveting the sheathing. On the upper gates, 77 feet high (four leaves), 12 panels of skeleton were erected during the month and the same number riveted up. As to sheathing, 30 panels were erected, which is equivalent to a little over one leaf. At Pedro Miguel, on the upper gates, the skeleton was brought to the top in all leaves except No. 52, and most of the skeleton riveted up. Forty-one panels of sheathing were erected, equivalent to about one complete leaf and one-half of another leaf, although many of these sheathing plates were not fully fitted nor reamed.

The total tonnage erected December

1, without regard to its being riveted or fully fitted, is about 3,500 tons, out of a total of about 58,000 tons or 6.1 per cent; the total number of field rivets driven about 177,000, out of about 6,500,000, or about 3 per cent of the total.

Machinery and Equipment.

The inspection division reported as follows on progress on lock machinery and equipment:

Circular 614—Stoney gate and cylindrical valve machines—First Stoney gate valve machine which was tested, was ordered shipped to the Isthmus, and the second machine was mounted for test.

Circulars 619-635—Rack railway devices, etc—State of completion of delivery varies from 6 to 50 per cent. On all portions of these contracts, satisfactory progress has been made during the month, with the exception of the carbon steel castings, (Class 2, Circular 619) which delivery is very much behind time.

Circular 627—Gate operating machines—Satisfactory progress was made with the gate operating machine, but a second new main casting of the casing for the miter gate forcing machine was necessary.

Circular 616—Gate and girder hoisting machinery for emergency dams—Tests are continuing upon the three types of worm gearing hoists to be tried out as a part of this contract, at the works of one of the sub-contractors, with a special view to determining the lubricant best suited for this heavy service.

Emergency Dams.

Of the progress of rolling material for the emergency dams, the report says:

The inspection work in the United States progressed satisfactorily during the month. Up to the 20th of the month a total of 288 drawings of the turning and wedging machinery had been approved; also a large number of drawings for vertical trusses of the same. At the works of the contractors, 817 tons of riveted nickel steel; 338 tons of riveted structural steel; 445 tons of carbon steel castings; 138 tons of carbon steel forgings; and about 260 tons of miscellaneous cast iron castings, vanadium gate steel castings, in all about 2,000 tons of material, have been fabricated. Satisfactory progress was also made on the roller bearings, all the roller bearings for one dam having been completed during the month.

Flag pole, 300 feet long, eight feet in diameter at bottom, is en route by water from California for Masonic Home site, Elizabethtown, Pa. The pole could not be shipped overland.

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TRADE MEETINGS

Structural Section, Engineers' Society of Western Pennsylvania.

At the annual meeting of the Structural Section of the Engineers' Society of Western Pennsylvania, in the society rooms, Oliver building, Pittsburgh, on January 2, the following officers were elected and installed: Chairman, T. J. Wilkerson; vice chairman, Edward Godfrey; directors, Henry Gulick, Jr., Kenneth Seaver and William A. Weldin.

R. B. Woodworth, the retiring chairman, was the speaker of the evening, his subject being "Historical Notes on Structural Members." The speaker discussed the history of metallic beams and girders, starting with the modest cast iron sections first used, and terminating with the immense, built-up sections used in present-day practice in the construction of modern buildings and bridges. In part he said:

"History is the record of achievement. It has to do with the past, and its records, however written or graven, contain an account of what has been accomplished in the past by processes which may still be in operation.

"This paper is an endeavor to put together records from many sources in order to show the steps which may have been passed in the evolution of beam and girder design, and materially falls into two parts, first, a sketch of the gradual evolution of various types of beams and girders now in common use, and second, a discussion of that collateral history reflected in the patent office records of inventions.

"In a practical way the design of beams and girders begins with the researches made by Eaton Hodgkinson on cast iron beams. Mr. Hodgkinson read his first paper on transverse strains and strength of materials in 1822. In this paper he presented results of theoretic and experimental investigation which were continued throughout his professional career and bore rich fruit in the establishment of theory and practice of structural mechanics.

"The common beam at that time was the "T" and the correct theory was that the strongest form of beam was a symmetrical section of I-shape with equal top and bottom flanges.

"Mr. Hodgkinson ascertained by experimental investigation that in wrought iron the moduli of elasticity are practically the same for tension and compression, therefore the I-shape was the greatest absolute strength for wrought iron to resist bending stresses. This, however, was not true of cast iron, a metal then in common use for beam purposes. In this case the compression strength, and therefore the beam of greatest absolute strength should have the bottom flange with a larger proportional sectional area.

"The art of rolling iron took many years of labor and study for its development after the use of grooved rolls had been patented, but soon after 1830, owing to rapid progress in railroad work, wrought iron began to come into use for rails and bridges.

"The first wrought iron bridge, a span of 31½ feet, was built by Andrew Thompson in 1832, to carry a highway near Glasgow, Scotland. In 1846 William Fairbairn erected a tubular girder over the Leads and Liverpool canal, with a span of 60 feet, to carry two tracks of the Blackburn & Bolton railroad. In the same year a tubular plate girder span of 50 feet was built by James Milholland, on the Baltimore & Ohio Railroad, near Bolton depot. The sides and bottom were of wrought iron, but the top flanges were reinforced with 12x12 timbers.

"The first wrought iron "I" beams were rolled in France and England in 1853. The first rolled in the United States were rolled by the Trenton Iron Works in 1854. They were seven inches deep and weighed 81 pounds to the yard, a form known as a deck beam. In 1873 Carnegie, Kloman & Company, at the Union Iron Mills, Pittsburgh, rolled 15-inch beams weighing from 50 to 66 pounds per foot, 12-inch beams weighing from 38 to 60 pounds per foot, also channels, angles and tees.

"The Bessemer and open hearth processes of making steel, introduced respectively in 1856 and 1864, rendered it possible to produce ingots from which steel rails and beams could be rolled, but it was not until 1890 that steel beams began to compete seriously with wrought iron.

"The 'Pocket Companion,' issued by Carnegie, Phipps & Company, Ltd., in 1884, described a 12-inch, 32-pound beam with 5⅛-inch flange and 35-inch web; and a 15-inch, 41-pound beam with a 5½-inch flange and a 40-inch web. In 1889 channels, deck beams, bulb beams, tees and zees, were included.

"In 1876 double beam girders made of two beams united by bolts and separators, were made to support brick walls. In 1881 box girders of two beams with riveted flange plates, single beam girders with riveted flange plates and single web and box plate girders were used. The double and triple "I" beam girder formed by placing one above the other was used in 1887.

"The erection of a 10-story office building for the Home Insurance Company, Chicago, in 1883, designed by W. L. B. Jenney, popularized riveted plate girder. At this time the large bridge girder had

reached a good degree of perfection and the architectural engineer had only to adopt the railway engineer's methods. Single web plate girders had merited success and had been adopted by the railroads for spans of 100 feet or less, and the rolling of long and wide plates and long angles permitted fabrication without splicing."

The speaker urged the necessity at this day for standardization, and described the formation of the American Steel Manufacturers' Association for that purpose in 1895, through which the present uniformity of sections, weights and shapes had been secured. He also reviewed descriptions of a number of shapes which had been patented for various purposes and showed views of sections and methods of producing them.

Pittsburgh Foundrymen's Association.

Attendance was small at the regular monthly meeting of the Pittsburgh Foundrymen's Association, held January 2, in the lecture room of the Carnegie Technical schools. The near proximity of the holiday season cut down the number that would otherwise have turned out to hear the paper by Henry Cave, of the Davis Bournonville Company, New York, on the subject of autogenous welding. The lecture was illustrated with lantern slides, and was followed by a demonstration in the shops of the technical school.

Mr. Cove made free comparisons with other welding methods in the course of his paper. The attendance of foundrymen was augmented by a large attendance of Carnegie trade school students.

CARNEGIE BID LOW ON ARMOR.

Battleship Proposals Are Opened by Navy Department.

Bids for the construction of the two 27,000-ton battleships Oklahoma and Nevada were opened at Washington, January 4. The lowest proposals were from New York Shipbuilding Company of Camden, N. J., at $5,926,000 for one ship and the Fore River Shipbuilding Company of Quincy, Mass., at $5,935,000 a ship.

Only one other bid was received, that of the Newport News Shipbuilding Company, which was $6,450,000, exceeding the maximum set by Congress by almost $500,000.

The Cramp company of Philadelphia refused to submit a bid on the ground that the entire plant of the company would have to go on an eight-hour day basis if it took a contract.

The Fore River Company asked for the award of but one ship, the bid of $5,935,000 being for turbine engines. For reciprocating engines, desired by the department, the bid was $5,980,000. Indications are that one ship each will be awarded to the two low bidders.

The three armor-producing plants of the country submitted practically identical bids for supplying armor for the navy. The Bethlehem, Carnegie and Midvale companies bid $420 a ton for 13,104 tons of class A armor, or $483 a ton for 6,674 tons.

For class B armor, amounting to 445 tons; there was a slight difference in the bidding, the Carnegie Company's bid being $460 a ton; the Midvale and Bethlehem, $470.

For bolts and armor attachments aggregating 130 tons, all three companies bid $508 a ton.

LaBelle Mills to Operate.

Orders were issued by the American Sheet & Tin Plate Company last week for resumption at three hot mills of the LaBelle tin plate plant, Wheeling, W. Va., to-day (January 8). LaBelle is a 10-mill plant. Members of crews for the other idle hot mills have been asked to report and register.

The LaBelle plant has been idle most of the past year. During the long shutdown the plant has been brought up to a high state of repair, the boiler and power equipment having been entirely renewed.

Valley Furnaces in Blast.

After an idleness of 18 months blast furnace No. 1, of the Sharon group of the Carnegie Steel Company at South Sharon, resumed operations January 4. The Carnegie Steel Company is now running at full capacity at South Sharon, outside of the skelp mill, which will be started soon.

The Hall furnace of the Republic Iron & Steel Company, which closed in November, will be relighted within a few days.

"TRYING OUT" AUTOMATIC TRAIN CONTROL ON PENNSYLVANIA LINES WEST.

AUTOMATIC train control and cab signalling by the Gray-Thurber system was given a public demonstration on the Pennsylvania Lines West, December 29, when an engine on the Pittsburgh, Fort Wayne & Chicago division, equipped for the operation of the system made several trips between Jacks Run and Glenfield, Pa., hauling a car load of railway officials and persons interested in the system. Daily trial runs have been made over the equipped section of the line for several weeks and the successful operation of the system had been so satisfactory that a number of those interested were invited to witness the demonstration.

The Gray-Thurber system of automatic train control and cab signal is designed to convey into the cab of a steam railroad locomotive or an electric traction car, the same character of signals now indicated on the side of the track by the automatic block signal system in use on steam railroads, and in addition, after sufficient opportunity has been given to the engineer or motorman to obey the signals, automatically shut off the steam or electric power and apply the brakes, controlling the engine should the engineer or motorman fail.

All electrical appliances of the system are controlled by closed circuits, and any injury to the equipment or circuits, either electrically or mechanically, will be immediately detected by the signals given and the stopping of the train.

The track wiring is exactly the same as that used by most railroads for automatic semaphore block signal indications, with the addition of an extra point to the track relay to transmit up through the wheels of the engine to the cab the same kind of a signal indication as that displayed by the automatic semaphore signal placed alongside the track.

The locomotive equipment includes a miniature signal indicator which reproduces signals identical with those indicated by the track semaphore, a caution whistle and a danger bell to call the attention of the engineer to the signals given, a throttle controlling cylinder operated by air, which automatically shuts off the supply of steam, and automatic brake valves located just below the engineer's brake valve. A recording clock near the steam gauge operates a continuous tape over rollers at a rate of three inches an hour. Signals are recorded by the relay magnet arm pressing down on a roller cutter, and puncturing the tape as it passes over a grooved steel roller. Printed on the tape are the four different kinds of signals which the clock records, namely, caution and danger signals, brakes set, and air shut off. The first two give the time and kind of signals received, the third whether the brakes were set automatically or by the engineer, and with the fourth a record is made when the cut-out valve is closed and the air is cut off for any reason from the automatic control.

POWDERED COAL AS POWER PLANT FUEL AND IN PUDDLING AND HEATING FURNACES.

PITTSBURGH INVESTIGATORS INSPECT LEBANON (PA.) PLANT—METHODS ACCEPTED AFTER PRACTICAL TESTS EXTENDING OVER YEARS—PITTSBURGH SLACK USED.

SENATOR WILLIAM FLINN, chairman of the City Planning Committee of Pittsburgh, last week arranged for an inspection trip for members of the city council and other officials, to the works of the American Iron & Steel Manufacturing Company, Lebanon, Pa., for the study of methods employed at that plant in the use of powdered coal as a fuel, with a view of improving present smoke conditions in the Pittsburgh district. Mr. Flinn was accompanied by Councilmen E. V. Babcock, Robert Garland, P. J. McArdle and Dr. J. P. Kerr and City Smoke Inspector J. M. Searle.

At the Lebanon works the gentlemen were informed that the company had been using powdered coal as a fuel in its 100 furnaces, including puddling, heating and boiler furnaces, for nine years and that the fuel had given perfect satisfaction as to reliability, efficiency and economy. That it was not adopted as a means of smoke prevention, but as a means of economy and that a saving of over 30 per cent had been secured over former methods of firing by hand.

At this plant the company uses 100 tons of fuel a day and at Reading, Pa., it has another plant which uses 60 tons daily, all of which is powdered and fed to the furnaces as desired through pneumatic tubes. The fuel used is Pittsburgh bituminous coal, received in the form of slack. The cars, as received, are run on an elevated trestle from which the coal drops by gravity into a coal house with a concrete bottom and a capacity of 1,000 tons. A worm conveyor carries the coal to a conveyor at one end of the building, which deposits the fuel in a dryer, a rotating cylinder 72 inches by 18 feet. The coal drops from the dryer into the powdering mill, which reduces it to the impalpability of flour and it is carried to the various furnaces by a blast produced by a Sturtevant blower.

The fuel in this form produces a clear flame, and the stacks are as free from soot or smoke as though gas fuel was used. The heat is constant and easily regulated, and is just efficient in furnaces 500 feet from the powdering mill as in those immediately adjacent.

Items of economy presented to the visitors, included the fact that the highest possible efficiency is obtained from the fuel; that but five men are required on each shift to handle this tonnage; that grate bars are eliminated and that no time is required for cleaning furnaces, against two hours of each twelve, allowed for this purpose under hand-firing methods.

A statement was made by a member of the party that a few Pittsburgh manufacturers had presented the claim that a clear flame occasioned a loss in metal melted, due to oxidation, which renders smoke a necessary evil on a basis of economy. Officials of the Lebanon company stated that the loss from this source in that plant is not greater than of other plants, and called attention to the fact that natural gas was considered an ideal fuel in Pittsburgh when it could be obtained at prices in favorable competition with coal.

COAL AND ORE TRAFFIC

Dockage Arrangement by Shenango Interests and Carnegie Coal Co.

To facilitate its transportation of coal to the docks at Superior, Wis., and Duluth, Minn., the Carnegie Coal Company has closed a contract with the Shenango Furnace Company. It represents a traffic agreement that will aid in the ore and coal transportation by both companies.

The Shenango Furnace Company owns a fleet of five new boats: the Schoonmaker, 14,000 tons; Shenango, 12,000; Wilpin, 10,000; W. P. Snyder, 9,800, and a new vessel of the same capacity as the Schoonmaker that will be launched this month. These vessels will have a carrying capacity of 1,000,000 tons of coal during the season. The vessels will carry ore from the mines of the Shenango company to Lake Erie ports, so that with down cargoes of ore and up cargoes of coal, the traffic arrangement will be complete.

The Carnegie dock at Superior, which has been in operation for some time, is one of the fast docks on the lakes. It has a storage capacity of 500,000 tons and is equipped with two self-moving bridges with five-ton clams, each bridge having an unloading capacity of 30 0tons an hour. The new dock on the Duluth side, when fully completed, will have a storage capacity of 1,000,000 tons.

LARGE POWER PROPERTIES.

Involved in Merger Projects in Two States—Pittsburgh Men Interested in New York Financing.

The Adirondack Electric Power Corporation, with headquarters at Saratoga, was incorporated at Albany, N. Y., on December 27, with a capital of $12,000,000, to acquire the property of the Hudson River Water Power Company and several other up-State electric corporations. The directors are:

John P. Reynolds, Francis M. Edwards, James R. Hooper, Boston; Senator Edgar T. Brackett, Saratoga; Edward S. Webster, Chestnut Hill, Mass.; Wilson A. Shaw, Charles E. Willock, Pittsburgh, and John S. Scully, Washington.

In addition to the Hudson River Water Power Company, the new company is to take over the Hudson River Power Transmission Company, the Saratoga Gas, Electric Light & Power Company, the Hudson River Electric Company, the Hudson River Electric Power Company, Empire State Power Company, Ballston Springs Light & Power Company, and the Madison County Gas & Electric Company. All the directors, except Senator Brackett and Mr. Edwards, composed the bondholders' committee of the Hudson River Water Power Company, which, with several of the other companies, were sold under Federal foreclosure proceedings in August last.

The incorporation papers say that the Stone & Webster Management Association, of Boston, has agreed to act as manager of the new company, which desires to issue $10,000,000 in bonds, $5,000,000 of which are to be available at once.

Merger Plan at Harrisburg, Pa.

Interests identified with the Paxtang Eectrical Company and the Harrisburg Light, Heat & Power Company, two Harrisburg (Pa.) corporations have plans completed for a merger, the success of which is contingent on the passage of a new franchise ordinance in Harrisburg councils. The present franchises prohibit consolidation of the competing companies. Concessions to be offered the city of Harrisburg to secure the repeal of the anti-consolidation clause include:

1—Removal of all poles and wires in the commercial district of city and substituting for same underground conduits.

2—Prices of street lamps to be reduced and a maximum rate to be fixed which shall not be exceeded in future contracts.

3—A reduction to be made in the rates of commercial and residential lighting of an average of ten (10) per

cent, and not to exceed ten (10) cents net per kilowatt hour.

4—A reduction of rates for wholesale lighting and power business, depending upon the amount of electricity used.

The projectors of the merger promise to expend $500,000 in extensions and improvements to plant.

Promised Extensions at Oil City, Pa.

The Oil City (Pa.) council is considering a petition from the Citizens Traction Company, asking for a 21-year extension of the present lighting franchise. F. D. Shafer, superintendent of the traction company, announces that the company is negotiating with a syndicate for the reorganization of the Citizens Traction Company, which will probably be successful, provided an extension is granted of the franchise. The syndicate proposes to refund an issue of bonds of $750,000, and make a new issue of $1,000,000, so as to enable the expenditure of $200,000 immediately, and which is necessary to put the road and power plant in first-class condition. This expenditure of $200,000 will cover the laying of new track, buying new cars, providing duplicate machinery and other apparatus.

New Tennessee Hydro-Electric.

The first hydroelectric plant established in Tennessee was put in operation in Carter county on Christmas morning, when the new power was transmitted in electric current to the town of Elizabeth, as a test. This plant, built by the Watauga Power Company, is located in the "horseshoe" of the Watauga river, 25 miles southeast of Bristol, Tenn., and the work of establishing it has required two years, and an investment of about $300,000. Officers of the company reside at Elizabethton, and are: Lee F. Miller, president; W. E. Hunter, vice president; J. H. Grayson, secretary and treasurer. The work was accomplished under the direction of Francis R. Weller, a hydraulic engineer, of Washington, D. C., assisted by R. L. Weide, of Washington, the resident engineer during the work.

Transmission lines have been constructed between the dam and Elizabethton and thence to Bristol, with sub-stations at Elizabethton and Bristol. A similar line will be constructed to Johnson City, and among the three towns that company will distribute the power, full capacity being 3,000 horsepower. Two thirds of this power has been leased to parties at Elizabethton and Bristol, the Bristol Gas & Electric Company taking a large contract.

The concrete dam rests on a foundation of granite and is anchored in a granite wall on either side of the river. The dam is 58½ feet in thickness at the base, 55 feet high and 350 feet in length, and it forms a lake one and a half miles in length. The machinery for the plant is of Westinghouse make, while the turbine wheels are from the S. Morgan Smith Company, of York, Pa.

In addition to this plant the company has two other available water power sites and will be in a position to develop 7,500 horsepower as rapidly as it may be needed.

Another power plant, upon a much larger scale, is being established in the Tennessee river, near Chattanooga, and will be ready for use in the near future.

SCRAP AT PANAMA.

Total Valuation Placed on It by Government Is $2,112,000.

[From the Canal Record, Dec. 20.]

One of the sights of the Canal Zone is the discarded locomotives, cars, dredges, barges, boilers and miscellaneous junk which border the route of the Canal, flotsam from the wreck of the French efforts. A considerable part of this abandoned machinery has been renovated and put in use by the Americans. Up to January 1, 1911, 58,620,309 pounds of it had been shipped as scrap to buyers in the States; the value of this and of the machinery put in use by the Americans aggregates $2,112,063.

On September 5, 1911, bids were opened in Washington for the purchase of all the French scrap remaining on the Isthmus and not taken up on the property papers of the Commission and credited to the French scrap account. It was stipulated that three years should be allowed in which to remove all the material and that the Panama railroad should charge a flat rate of $2.25 a ton for hauling to seaports, loading to be done by the contractor. The successful bidder was the Chicago Housewrecking Company, which offered $215,000.

This firm has begun the work of removal and is employing on the Isthmus about 50 laborers.

Dealers in scrap recognize about three hundred classifications of iron and steel. The representative of the Chicago Housewrecking Company says that practically every grade is to be found in the scrap which his men are sorting.

Within a short time the firm will have in use at Dock 14 two 20-ton locomotive cranes, one with a 50-foot boom, equipped with electric magnets capable of lifting three tons. It will have in addition a pair of power shears, capable of cutting through a bar of steel six inches square in cross-section. A great part of the metal will be cut into lengths of three feet, for convenience in melting. At present the machinery is broken to pieces by cutting the rivets with sledge and "cold-cut." It will be shipped direct to the buyers in the States.

EXCESSIVE CAR WHEEL LOADS.

A Prediction That New Wheel Specifications Will Be Needed.

The Railway "Age-Gazette" in its current issue, voices a protest already made by some steel car manufacturers to the effect that the proposed use of 80-ton freight cars with four-wheel trucks for special service naturally suggests some consideration of the effect of excessive loads on the rail, the wheels and the journals of very high-capacity cars. "The limits for the unit pressure on these details have been frequently fixed by engineers, as failures of structures or material have developed, but these limits have steadily increased as the traffic conditions have demanded larger capacity in railway equipment," continues the "Age-Gazette." "In this development the design and proportion of the structure have been made adequate for the service, and material has been so improved as to safely sustain the load, but with increasing wear and more rapid destruction as the greater loads have been imposed. In 1882 the M. C. B. Association discussed a report on the Capacity of Freight Cars—Can It Be Safely Increased Above 20 Tons? The car wheel load was then 8,000 pounds, and 12,000 pounds was regarded as a proper limit for the weight on a locomotive driver. Even at that time the Pennsylvania and the Reading were experimenting with locomotives with a load of 16,000 or 17,000 pounds per wheel, and the Great Northern of England was operating a locomotive carrying 20,000 pounds per driver. In the United States we now have engines with a load of 30,000 pounds per driving wheel.

"The proposed 80-ton car will weigh about 50,000 pounds, and the total weight of the loaded car will be 210,000 pounds, which when carried by eight wheels produces a static load on the rail of 26,250 pounds. Weights on drivers have always greatly exceeded the load on the smaller car wheels, and there are reasons, apart from the effect of the difference in diameter on the rail, why small wheels will not endure as severe service as large ones. It is taken for granted that solid steel or tired wheels will be used for the high-capacity car, as the solid steel wheel is already largely used for 50-ton cars. The smaller steel wheels or tires do not render as satisfactory service under heavy loads and high speeds as the larger locomotive tires, principally for the reason that the manufacturer is not able to put into the small tire sufficient mechanical work to obtain uniform physical properties for the full circumference of the tire, and in the service portions of the tread thickness."

THE BAR TRACK TROLLEY IN FOUNDRY SERVICE.

By Frank C. Perkins.

IN THE accompanying illustration, Fig. 1, is shown a foundry using a bar track trolley system for pouring the molten metal, the self-contained cross-over utilized being shown in Fig. 2. For certain uses, the bar track trolley is declared to be preferable to the single I-beam trolley, but for general purposes the single I-beam is advocated as being more adaptable. The bar track trolley is good because of the comparatively large diameter of wheels, good distribution of load on the roller bearings very easy running and light weight of the trolleys complete. The supports must be relatively quite close together and must be supported by some overhead structure.

The track way for the trolleys, here shown, is ¾x4 inches and the supports have to be rather close together in order to have strength in track against side stresses.

Fig. 3 shows the use of the bar track trolley system with pneumatic hoist in a modern brass foundry. The general idea in utilizing the air hoist was to secure strength, durability, lightness and safety combined with good speed control.

The modern air hoist is made of steel tubing, with steel castings for all parts under stress. Its weight is a minimum and its strength is a maximum, the capacity being from 400 pounds to 20,000 pounds. Air hoists are usually used at 80 pounds pressure, but other pressures can be used at proportionate capacities the parts being designed to carry 110 pounds air pressure with a factor of safety of six under full load.

The hoists, 5 inches diameter, have cylinders made of steel tubing, turned, ground and polished to a perfect surface on the inside. A cast steel ring is screwed to the cylinder and a cast iron lower head is bolted thereto, the joint being made tight by metallic packing.

As the stuffing boxes are usually long, they produce but little friction and reduce leakage. The piston is screwed to the piston rod and positively locked while the lubricator on the valve admits one drop of oil each time the handle is turned.

In the single acting hoist, no air can be sucked into the cylinder when lowering, the air exhaust from the lower portion of hoist passes to the upper side of piston. For speed control, a threaded plug in the valves regulates size of port openings to the hoist, which controls the maximum speed of hoisting or lowering. A proper size opening to the exhaust prevents a run-away action of the piston in case sling or hook were to break. For especially delicate work the speed controllers are used on hoists. In this case the hoists are balanced and have splendid speed control, and are used for the most delicate hoisting, where loads are variable, as pouring iron from a ladle or drawing patterns.

Fig. 1—Monorail charging equipment.

Fig. 2—Cross-over.

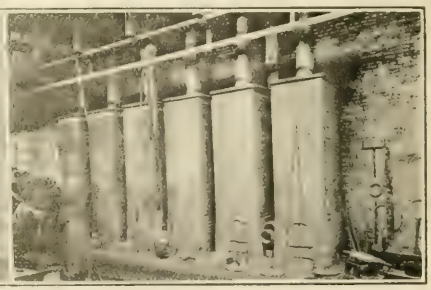


Fig. 3—Bar Track Trolley, Pneumatic Hoist.

Operations at Steelton.—President E. M. Felton, of the Pennsylvania Steel Company, says: "Our tonnage of unfilled orders at this time is about 75 per cent more than it was at this time a year ago. This includes steel rails. While the prices received to-day are low, it looks as if the bottom had been reached and that the recent advances will hold. The outlook is more encouraging than it was a year ago. We are running at about 70 per cent of our capacity." The Sparrows Point mills of the Maryland Steel Company, have an order for 6,600 tons of rails from the Stone & Webster Corporation.

Boston Chamber of Commerce has raised $500,000 guarantee fund to back small manufacturers.

PRINCIPAL STEEL CAR ORDERS OF THE WEEK.

MISSOURI PACIFIC.—500 box cars, Standard Steel Car Company.

GREAT NORTHERN—1,500 refrigerator cars, Haskell & Barker Car Company.

[illegible] IRON COMPANY (Alabama)—100 freight cars, Pressed Steel Car Company.

[illegible] & OHIO—200 steel underframe flat cars, American Car & Foundry Company.

BURLINGTON—10,000 gondolas, Pressed Steel Car Company; 1,500 gondolas, American Car & Foundry Company.

AMERICAN BRASS COMPANY

Wipes Out Subsidiaries and Continues All Plants Under One Name.

Four brass and copper foundry companies of Ansonia, Waterbury and Torrington, Conn., all subsidiaries of the American Brass Company, were wiped out on January 1, and their operations, plants, and good-will were taken over by the American Brass Company, until now merely a holding corporation. By this process the American Brass Company, instead of controlling these companies as it has in the past, through stock ownership, will consolidate the entire business in its own hands.

On January 1 the customers of the several subsidiaries received notice that orders should be placed hereafter with the American Brass Company, instead of the separate corporations with which they have been dealing. The actual change in handling the business was slight. Instead of the subsidiaries, the American Brass Company takes over branches known by the names of the old corporations. Each branch will have its own accounts, as the companies do now, but checks are now drawn to and by the American Brass Company.

The names of the defunct companies in Connecticut are:

The Ansonia Brass & Copper Com-

pany of Ansonia, Conn.; the Benedict & Burnham Manufacturing Company, of Waterbury, the Coe Brass Manufacturing Company, of Torrington and Ansonia, and the Waterbury Brass Company.

Besides the corporations that are wiped out the American Brass Company also controls the Chicago Brass Company of Kenosha, Wis., the Waterbury Brass Goods Corporation, and the Ansiona Land & Water Power Company. They are owned by the present subsidiaries, and under the new regime they will become the property of the American Brass Company through stock ownership.

The American Brass Company was incorporated in Connecticut in 1903 to hold the stock of the four principal constituent companies. The brass industry had long centered in the Naugatuck Valley, and the stock of the four companies was largely in the same hands. Large owners in one company were large owners in the others. The stock was also closely held, and the few families that were dominant in the industry in Waterbury, Ansonia, and surrounding towns decided to amalgamate their interests with a view to simplicity and economy in production.

Consequently, at the formation of the American Brass Company, it acquired not only the control, but the entire capital stock of the constituent corporations. It was first capitalized at $15,000,000, but this has twice been increased by $2,500,000, so that the present capitalization is $20,000,000. Of this, however, only $15,000,000 has been issued. Most of the other companies in the merger were taken in soon after its formation, and the recent policy of the directors has been not to increase their percentage of control over the brass industry.

The present plan was authorized by the directors, who are also the principal stockholders. The new arrangement will make no change in the chief officers of the American Brass Company, which will remain as follows: President, Charles F. Brooker; vice presidents, Edward L. Frisbie, A. A. Cowles and James S. Elton; treasurer, John P. Elton; secretary, Gordon W. Burnham. The other directors are Thomas B. Kent, J. E. Wayland, E. Holbrook, Arthur C. James, John J. Sinclair, Cleveland H. Dodge, James A. Doughty, Adelbert P. Hine, and T. Brownell Burnham.

The American Brass Company has paid dividends of 5 per cent since its organization, with extra dividends ranging from ¼ to 1½ per cent in different years. Its total receipts in 1907, when business was booming, were $3,525,896. For 1910 they were $1,069,860.

Decision on Charter Reserved.

At the State Department at Harrisburg, Pa., last week, arguments for and protests against the granting of a charter for the City Electric & Power Company for Reading, Pa., were heard, and Deputy Attorney General Hargest announced that he would reserve his decision.

The Lumen Bearing Company, of Buffalo, recently has appointed Louis S. Jones and O. Schwaner, sales representatives in the Pittsburgh district. The former was for many years with the Prentiss Tool & Supply Company. H. F. Russell, formerly purchasing agent, has been appointed sales representative covering Central and Western New York and Eastern Pennsylvania.

CUTLER-HAMMER LIFTING MAGNETS USED IN THE HANDLING OF STEEL PIPE.

LIFTING magnets for use in steel mills and other plants where large quantities of pig iron, scrap, etc., are handled, are in everyday use. It is very commonly assumed that their efficient employment ends with these applications. There are, however, many profitable uses of smaller magnets and special type magnets. Thin steel sheets, piping, etc., can be handled by magnets of the proper design.

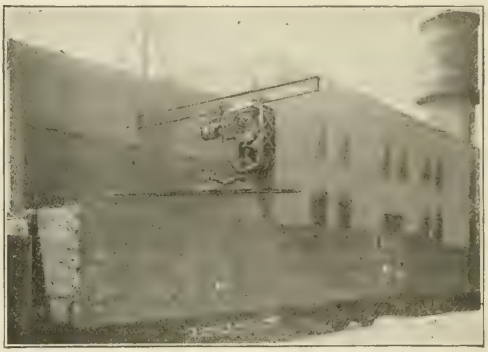


Fig. 1—Pair of Cutler-Hammer 18-in. lifting magnets unloading pipes.

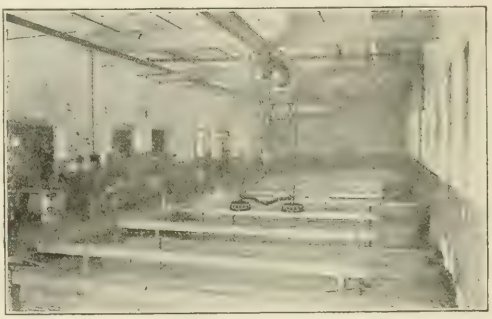


Fig. 2—Magnets in Pipe Storage House.

A recent installation of two Cutler-Hammer 18-inch lifting magnets at the Chicago plant of the Rockwood Sprinkler Company has already verified the theory of H. M. Pulsifer, president of the Rockwood Company and designer of the plant. At this plant fire protective sprinkler systems are designed, assembled and prepared in "knock-down" form for shipment. The material handled consists of steel piping, ½-inch to 10-inch, fitting valves, sprinkler heads, etc. In the illustration Figure 1, the magnets are shown unloading a carload of pipe, the crane trolley being extended over the railroad spur for this purpose. From the cars the pipe is carried by the magnets into the storage house (Figure 2), and deposited in compartments, according to size, ½-inch to 10-inch pipe being used. The crane operator, alone, can do this work and as all the transporting is done from overhead, no floor space is needed for trucking and there is no interference with other work. The magnets operate steadily and noiselessly, accomplishing their work in quick time. Sprinkler equipments ready for shipment are also loaded by the aid of the magnets. The current taken by small magnets of this type is less than that required by the household electric iron The consumption of current for each of the 18-inch magnets used in this plant is 1.9 amperes at 220 volts.

ELECTRIC FURNACE PRACTICE FOR MAKING OF SMALL STEEL CASTINGS.

[Editorial Contribution to "Metallurgical and Chemical Engineering" for January.

NEGLECTING malleable, semi-steel, and other kinds of castings masquerading under the good name of steel castings, there have been in the United States until recently only three processes for the manufacture of steel castings.

All specifications to date call for steel castings to be manufactured by one of the following processes: crucible process; Tropenas or similar processes; open hearth process.

It is quite usual to divide commercial steel castings into three grades, viz.: soft, medium and hard. The chemical characteristics corresponding to these three grand divisions are in general as follows:

	Soft	Medium	Hard
Carbon	{ 0.10 to 0.20	0.20 to 0.35	0.35 to 0.50
Manganese	{ 0.20 to 0.85	0.20 to 0.85	0.20 to 0.85
Phosphorus, not over	0.05	0.05	0.05
Sulphur, not over	0.05	0.05	0.05
Silicon, not over	0.40	0.40	0.40

The corresponding physical characteristics when the steels are properly annealed are as follows:

	Soft	Medium	Hard
Tensile strength, minimum in lbs. per sq. in.	55,000	65,000	80,000
Yield point, minimum, in lbs. per sq. in.	27,000	31,000	38,000
Elongation, pr ct.	22	18	15
Reduction, pr ct.	30	25	20
Bending test	120°	90°	Slight

As a general proposition the essential characteristics of the majority of steel castings are as follows:

First—Castings well cleaned, secured by sand blasting.

Second—Solid castings, secured by proper gates and heads.

Third—High yield point, approximating the ultimate strength, secured by soft or medium grade of castings.

Fourth—A good bending test, secured by soft or medium castings.

Fifth—Freedom from brittleness when cold, secured by low phosphorus.

Characteristics 1 and 2 are within the control of every foundry. Moreover, defects in these qualities can usually be detected by the consumer through surface inspection.

Qualities 3, 4 and 5 can only be determined by the consumer through laboratory tests, and, in the absence of such tests, by care in selecting the manufacturer and the process he uses.

Crucible-Steel Castings.

The manufacture of crucible steel castings as practised in this country is purely a melting process, requiring little or no technical knowledge, as is evidenced by the rapid almost mushroom growth in the number of plants throughout the country and clearly shown in the records of the advertising pages of technical journals.

Crucible-steel castings are, as a rule, made from punchings purchased in the open market. Unless careful analysis is made of each and every car bought, most varying results in the castings are apt to follow. In this process there is little or no change in the phosphorus and sulphur during the melting of the punchings. The percentages of silicon and manganese are more or less under the control of the melter. The increase in the percentages of carbon is the most serious drawback to this process; in general it increases about two-tenths of 1 per cent.

The average good crucible steel casting will analyze:

Silicon	0.25 to 0.50
Manganese	0.40 to 0.80
Phosphorus	0.025 to 0.040
Sulphur	0.030 to 0.040
Carbon	0.35 to 0.50

The percentage of carbon in the punchings may remain constant during the melting, if the raw material is melted most carefully in a clay or clay-lined pot. This is rarely or never done in commercial practice, owing to the added initial cost of the pots and the fact that they last for fewer heats than the regular graphite pots.

If punchings of the same analysis are melted in graphite pots, the resulting steel will vary from pot to pot, and will also vary when melted in the same pot, depending upon how often the pot is used.

The change that takes place is well illustrated by the following actual test, which was an effort to make low-carbon steel castings, the material charged in the pot being selected muck bar:

Muck Bar.		Casting.	
Silicon	0.21	Silicon	0.17
Manganese	0.00	Manganese	0.39
Phosphorus	0.264	Phosphorus	0.204
Sulphur	0.017	Sulphur	0.015
Carbon	0.09	Carbon	0.29

From what has preceded it is to be noted that commercial crucible steel castings (owing to high carbon content) come under the grade known as hard. They are usually difficult to machine and will stand little or no bending test. Due to the fact that the crucibles hold only 80 to 100 pound of metal, more or less variation in the chemical and physical qualities is bound to result in a given lot of castings. While one casting may possess the desired qualities, a similar casting poured from the succeeding pot may be far below the standard.

Many consumers of small steel castings have purchased them from the foundries using the crucible process, under the false impression that they compared in quality with "crucible steel," otherwise known as "tool steel."

Tropenas Steel Castings.

The Tropenas, like the crucible process, is a melting, rather than a refining, method for making steel.

Tropenas steel castings are made by first melting the material in a cupola and then changing it to steel by means of a converter. A typical charge for the cupola would consist of about 63 per cent of pig iron, 20 per cent of steel or wrought scrap, and about 17 per cent return scrap, that is to say, sink heads and gates from steel castings.

It is to be noted that the resulting product of the cupola comes more or less under the head of what is known to the trade as semi-steel. This semi-steel is tapped from the cupola into the converter and by means of a blast of air the carbon, silicon and manganese are burned out. Ferromanganese, ferro-silicon or silicon spiegel are then added to give the desired amounts of carbon, manganese, and silicon.

The Tropenas process is essentially the old well-known Bessemer process under a new name and on a smaller scale. Its main claim to superiority over the latter being that the air for combustion is not blown through the metal but on the surface of it. Like the Bessemer, it is also inferior to the open-hearth process.

Without the most careful selection of coke for melting in the cupola, high-phosphorus and high-sulphur steel will result. Great care must be exercised in selecting and analyzing the pig iron used, as the phosphorus and sulphur therein are not removed. The failure or success of this method of making steel castings is largely dependent upon the skill of the particular melter in charge.

Steel made by this process has the valuable characteristic of being extremely fluid owing to its high temperature. It is not, however, as well adapted to the making of small steel castings as the crucible process, because the metal must be taken from the converter and poured into the mould from ladles which are at a much lower temperature than the converter, whereas in the crucible process the steel is poured from the crucible in which it was melted.

The Tropenas process, as generally practiced, overcomes the defects of the crucible process, in that the carbon is more or less under control and lower carbon steel can be made, but great and wide fluctuations may occur from day to day in the different plants in the percentages of phosphorus and sulphur.

Below are given the analyses of castings from two different plants:

Silicon	Mang.	Phos.	Sulphur	Carbon
0.41	0.29	0.052	0.050	0.26
0.24	0.71	0.100	0.043	0.32

As far as a commercial proposition is concerned, and as far as the day in and day out practice of making good steel castings is concerned, neither the crucible nor the Tropenas process seems to exactly fill the bill.. The majority of the purchasers of steel castings buy without the rigid requirement of specifications, because to meet the specifications the manufacturer generally exacts an increased price, and therefore it is this day-in and day-out practice that the average customer is interested in.

To the purchaser who requires soft or medium castings the crucible process holds out little hope, and in the Tropenas process the case is little, if any, more encouraging because of the phosphorus and sulphur.

In the former, the manufacturer hopes as to his carbon and softness of his castings, while in the latter he does the best he can with the materials on hand and trusts his castings will not be too cold short.

The quality of steel castings made by the open hearth furnace is far superior to those made by either of the processes mentioned, but, owing to the difficulty in handling the product, it is not generally used in the making of small steel castings in this country.

Electric Furnace Castings.

The needs for and the increase in the number of electric furnaces are closely related to the introduction of the automobile and the requirements of the builders thereof.

The electric furnace, like the automobile, came in with the century. In 1904 there were only four electric furnaces in Europe, whereas there are now over 100.

Unlike the automobile in this particular, however, while America produces the greatest number, it is far behind Europe in the adoption of the electric furnace. Foreign automobiles are held at a premium in the United States and many manufacturers here go to Europe for materials which, they say, cannot be procured in similar quality in this country.

An examination into Europe's metallurgical methods bears evidence to the fact that many crucible steel plants have discarded and abandoned their crucible furnaces and installed electric furnaces. In the United States electric furnaces have been installed for the making of tool steel or refining steel made by the Bessemer or even the open hearth process.

While electric furnaces require for their successful operation a chemical and physical laboratory and the best of technical knowledge, they do make good steel starting with either hot or cold raw material of any composition, pig iron, steel scrap, or even from iron ore. The secret of success is in the procuring of a high temperature, the absolute control of the percentages of the elements which go to make up good steel, and the fact that the bath of molten steel can rest a long time underneath a neutral slag, permitting the removal of any gases or included slag, and the proper co-ordination of these various factors.

Electric furnace steel can be made with any carbon content, phosphorus can be reduced when desired to between 0.01 and 0.02 per cent and sulphur can be kept within the same limits. In fact, as stated, all the elements are within absolute control, as the metal need not be tapped from the furnace until its chemical and physical character meet the wishes of the melter, and in turn correspond exactly with the specifications of the consumer.

These valuable features are found in no other known metallurgical process for iron or steel, nor are they so easily attainable, nor to such a degree, by other means as they are in the electric furnace.

"CHEAP POLITICS" IS TO BLAME, SAYS PRESIDENT JAMES A. FARRELL.

President James A. Farrell, of the United States Steel Corporation, was the principal speaker at the eighth annual banquet of the Pittsburgh Steamship Company, at the Hollenden hotel, Cleveland, on last Wednesday night.

President Farrell read from notes a long statement dealing in a general way with the relations between the parent steel and the related steamship corporations. Of business conditions he said:

"Business conditions during the past year have been far from satisfactory. The pernicious and harmful activity of cheap politicians playing cheap politics has delayed prosperity. I feel sure that recovery from the depression would not have been so long deferred had not corporations been subjected to these harmful and wrong attacks.

"These attacks on corporations, on big business enterprise have become a matter of concern, not only to the corporations, but to individuals connected with them because of the losses which these individuals are sustaining through these attacks.

"I think the people are beginning to recognize that such methods are productive of nothing save cheap political foment and a discontent which does more than anything else to stifle competition. While this unfair political churning continues we cannot have satisfactory business conditions, let alone prosperity.

"I believe also that the people are beginning to be interested in seeing corporations get a square deal—they are realizing that this has not always been so. Indications are that pessimism over the conduct of business has been overdone, and that this unwarranted political agitation is about over. People are beginning to realize with a clearer perspective and understanding how big business should be and is conducted. They are realizing that corporations not only develop themselves, but individuals as well."

In proof of this last statement President Farrell spoke at some length of the welfare work of varied nature, being done by corporations among their employes.

Successful business, like ideal government, is conducted on square principles, he declared.

Harry Coulby, president and general manager of the Pittsburgh Steamship Company, acted as toastmaster. He introduced President Farrell as "a first-class sailer spoiled, to make a first-class president."

Prefacing his introduction, Toastmaster Coulby said:

"I feel certain that if some of the people who run about the country knocking big business and corporations promiscuously, could sit down at some of our meetings and learn what we have accomplished in the past and shall accomplish in the future, they would change their song."

Using Mushroom Type.

The Aberthaw Construction Company, Boston, has completed one and two-story portions of the large concrete beam house of the American Hide & Leather Company, at Lowell, Mass. The first mushroom floor of the hide storage building has also just been completed. Lockwood, Greene & Company, of Boston, are the architects and engineers for this work.

A CENTURY OLD CHAIN SUSPENSION BRIDGE.

The [illegible] illustration shows the construction of the remarkable essex-Merrimac chain [illegible] which has been in service a hundred years. The Industrial World is indebted to the American Rolling mill Company, of Middleton, Ohio, for the photograph of the bridge, at Newburyport, Mass. The wrought-iron links of this structure were tested recently after being in use for 100 years.

The chain links were tested in direct tension, the load being transmitted to the links by U-shaped half links of 1 inch round steel. The latter were gripped by the wedges of a 40,000 pound testing machine so that the application of the load was in a manner similar to the manner of loading of the links in actual service on the suspension chains.

The average of yield-point was about 24,000 pounds per square inch, and the average ultimate strength about 37,500 pounds per square inch. The data of the tests are given in the following table:

TENSILE TESTS OF ENTIRE LINKS FROM NEWBURYPORT CHAIN SUSPENSION BRIDGE AFTER 100 YEARS SERVICE.

Link No.	Degree of Corrosion*	Diameter of Link, Inches	Yield Point, Pounds per Square Inch	Ultimate Strength, Pounds per Square Inch
1	B	1.63		37,800
2	B	2.00		31,000
3	B	1.82		40,780
4	C	1.53		27,100
5	B	1.76		40,030
6	B	1.53		44,000
7	B	1.53	26,100	40,700
8	A	1.53	30,000	42,550
9	B	1.76	19,350	26,075
10	B	2.00	19,500	27,078
12	B	1.76	27,170	43,800
		SUMMARY.		
Maximum			30,000	44,000
Minimum			19,350	26,075
Average			24,850	37,550

Average ratio of yield point to ultimate strength, 63.9 per cent.

*A—Very slight; B—Slight; C—Much.

The following is a description of this remarkable bridge given by the Newburyport "Herald" of December 14, 1810—over 101 years ago:

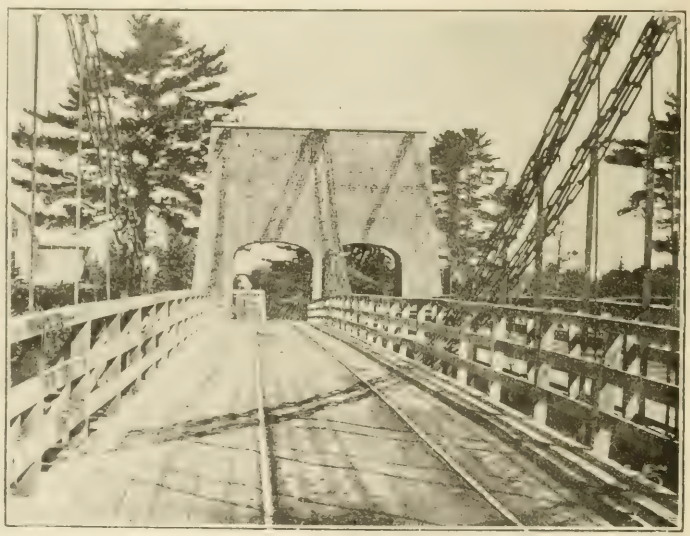
An Old Description.

"The chain bridge recently thrown over the Merrimac, three miles from this town, is now open for the accommodation of travelers. As the principles and mode of its construction are novel in this part of the country (being the first of the kind erected east of the Schuylkill) a particular description may be interesting to some readers.

"It consists of a single arch of 240 feet span, and 40 feet at its greatest elevation from the water. The abutments, 49x25 feet at the base, 45x20 at the top, and 37 feet high, are constructed entirely of rough and split stone, the latter of which is used in the exterior walls, each stone varying from ½ to 2½ tons in weight and from 3 to 14 feet in length, connected together and secured by iron bolts.

"The whole quantity of stone is 4,000 tons. On the abutments at each side of the river, framed piers or uprights are erected, of a sufficient height, and capped with stout timber to support the chains from which the flooring of the bridge is supported. The chains, ten in number were passed over the caps of the uprights, and extended or slackened so as to pass under the middle cross joists of the flooring and to describe a sinking curve, the entire distance of which, from a right line, is one-seventh part of the span; these are tripled where they bend over and rest on the caps, are each 516 feet in length and 256 feet along the curve line between the uprights. The ends descend from the uprights (with an angle of the same inclination that the curve makes inwards), to a space below the surface of the ground, and there secured sufficiently to counterbalance the bridge and any possible weight that may be brought thereon.

"The whole quantity of iron used in chains, securities, etc., is 22 tons. The two middle cross joists of the flooring rests upon the chains, and other joists are attached to them in nearly a horizontal line by suspenders from the curve. On the joists the string pieces are laid lengthwise, which receive the plank. The whole flooring admits two passages, 15 feet wide rises three feet in the center is firmly connected and strengthened by [illegible] stout railing, and has a very light and agreeable appearance. Horses with carriages may pass upon a full trot with very little preceptible motion of the bridge.



Famous chain bridge, 100 years old, at Newburyport, Mass.

Designed by Fayette County Man.

"The whole weight of flooring chains, suspenders, etc., commonly supported, does not exceed 100 tons, transient weight, the third part of which it is presumed can never be brought upon the bridge at the same time. The total cost is about $25,000. John Templeman, Esq., of the territory of Columbia, the contractor under whose superintendence this work was constructed, and for whose unremitting attention, ingenious talents, and the any valuable improvements suggested and adopted by him in its progress; likewise to Mr. Samuel Carr, of Newbury, the master carpenter, whose knowledge in bridge architecture is well known and appreciated, the public are much indebted, and we congratulate them upon the approbation.

"The principle upon which this work

was constructed was originally invented by James Finley, of Fayette county, Pa., and patented to him in 1808; it has since been considerably improved. As its chief materials are iron and stone, the woodwork being an inconsiderable part, very light, and its mode of construction peculiar, its superiority to timber bridges is obvious, and consists in simplicity of construction, durability and ease and cheapness of repair. It is particularly adapted to the bold features of the New England States where rivers have high precipitous banks, rapid tides and deep waters and where after fair experiment, we hope to see it generally adopted."

It is stated that the suspension chains for the bridge were forged on the spot and that the old smithy in which the work was done is still standing, though for many years it has served as a dwelling house, into which it was converted.

Analysis of the Chain.

In a recent address before the Engineers' Society of Western Pennsylvania during a discussion on "Metallic Roofings," James A. Aupperle, chief chemist of the American Rolling Mill Company, referred to the chain found in this bridge and gave the following as its analysis:

	Newburyport Chain
Carbon	.0500
Manganese	.0050
Silicon	.0190
Sulphur	.0070
Phosphorus	.0320
Copper	.0070
Oxygen	.0580
Nitrogen	.0033
Hydrogen	.0005

Commenting on this analysis, Mr. Aupperle said, in the address referred to:

"The chain from the Newburyport bridge across the Merrimac river when examined under the microscope shows the well-known ferrite structure almost free from slag. The oxygen content is but slightly higher than ingot iron [the American Rolling Mill Company's product]. The high purity and comparative freedom from slag and the 100 years' service of this chain prove that the purer the metal the better it will resist corrosion.

"According to available records the Newburyport Bridge had not been painted for 70 years and even if it had been frequently painted we should expect the paint to wear very rapidly where the links joined, due to the expansion and contraction as well as the vibration from traffic.

"The density or specific gravity of iron has considerable influence upon the rate of corrosion; the more porous the material the more rapidly will corrosion proceed, and the deeper and more destructive will it be."

DETERIORATION AND SPONTANEOUS HEATING OF DIFFERENT COALS IN STORAGE.

A Comparison, From Tests by the Bureau of Mines.

By Horace C. Porter and F. K. Cvitz, Pittsburgh Experiment Station, Bureau of Mines.

NOT many years ago coal was commonly regarded as an extremely unstable material, subject to serious alteration and losses on exposure to the elements. E. C. Pechin, in 1872, speaking before the American Institute of Mining Engineers, says:

Fuel suffers materially by * * * storage; especially with bituminous and semi-bituminous coals is the loss heavy, an exposure of only two weeks causing a loss of carbon to the extent of 10 to 25 per cent.

Similar views have been held in much more recent times. For example, in a paper before the United States Naval Institute, in 1906, we find the statement:

The pressure of the weight of coal causes gases to be evolved; * * * these gases constitute the chief and only value of the coal, in that they furnish the heat units. It is claimed that if a ton of fine bituminous coal be spread out on a concrete pavement * * * in the open air in this climate—Key West, Florida—for one year it will lose all its calorific properties. The gases are simply free to escape, and when the coal has lost all its gas it will have lost all its heat units and be simply coke.

This was only five years ago; but in 1907 a German gas works engineer claims to have found that moist fine coal sustained an average loss per week of 1.7 per cent, this loss being due to gas. The 1889 edition of Groves & Thorp's "Chemical Technology of Fuels" says: "In some places coal is known to lose 50 per cent of its heating value in six months." Similar statements are to be found in recent literature; but probably the majority of chemists and enginers to-day hold no such exaggerated ideas on the subject. There is, on the other hand, a well-defined suspicion in the minds of many that sufficient loss of volatile matter, and sufficient deterioration by oxidation, does occur in coal to be of industrial importance; and for that reason the investigations described in this paper were undertaken by the Bureau of Mines to accurately determine the extent of the deterioration in different types of coal.

First, a study was made in the laboratory of the loss of volatile matter from crushed coal during storage. A number of samples—20 pounds each—representing a variety of types from widely separated fields were broken to about ½-inch size and immediately placed in glass bottles in the mine. At the laboratory the accumulated gas was withdrawn, and a free continuous escape of the volatile products permitted at atmospheric pressure and temperature. The results of these experiments have been published in Technical Paper No. 2, Bureau of Mines, entitled "The Escape of Gas from Coal," and will therefore not be given here in detail. It is sufficient to say that while several coals evolve methane in large volumes, especially in the early period after mining, the coal suffered in one year a loss in calorific value from this cause of but 0.16 per cent, as a maximum.

It seems, therefore, that the loss due to escape of volatile matter from coal has been greatly overestimated.

At the instance of the Navy Department, which is a purchaser of coal to the value of $2,000,000 or $3,000,000 annually, and which stores large lots in warm climates for long periods of time, elaborate tests were undertaken to determine the total loss possible in high grade coal by weathering. The extent of the saving to be accomplished by water submergence, as compared to open air storage, was a point to be settled, and there had also arisen the question as to whether salt water possesses any particular advantage over fresh water for this purpose. An English railway and dock superintendent, in an article in the London "Engineer," 1903, reports that he has found coal accidentally submerged for 10 years in the salt mud of the English Channel actually improved in calorific value by 1.8 per cent, " which offers a very pretty question to chemists to say why." He claims that salt will preserve the virtues of coal, as it does those of many other things; "If coal is given a strong dose of coarse salt and water 12 hours before using, its calorific value is greatly improved."

Coal storage problems have assumed importance during the last few years on account of the uncertainties of supply due to strikes and transportation difficulties. The naval coaling stations, the Panama Railroad Company, the Great Lakes commercial coal distributing companies, large coke and gas or power plants at a distance from the coal fields, and the railroads themselves, particularly those in the west, keep 50,000 to 500,000 tons in storage a great deal of the time.

*Presented, by permission of the Director Bureau of Mines, at a joint meeting of the New York Sections of the American Chemical Society, American Electrochemical Society, and the Society of Chemical Industry, November 10, 1911.

In each case the tests by the Bureau were carried out as follows: Four types of coal were chosen, New River on account of its large use by the navy; Pocahontas as a widely used steaming and coking coal in the eastern section and as being the principal fuel used in the Panama canal work; Pittsburgh coal as a type of rich coking and gas coal; and Sheridan, Wyoming, sub-bituminous, or "black lignite"—a type much used in the west. Of the New River coal 50-pound portions were made up out of one large lot which had been crushed to ½-inch size and well mixed. These portions were confined in perforated wooden boxes and submerged under sea water at three navy yards differing widely from each other in climatic conditions, and 300-pound portions from the same original lot were exposed to the open air, both out of doors and indoors, at the same places.

With the Pocahontas coal the test was made only on the Isthmus of Panama, run-of-mine coal being placed in a 120-ton pile exposed to the weather. Pittsburgh coal was stored as run-of-mine in open outdoor bins of five tons' capacity at Ann Arbor, Michigan, also in 300-pound barrels submerged under fresh water. The Wyoming sub-bituminous was stored at Sheridan, both as run-of-mine and slack, in outdoor bins holding three to six tons each.

Every test portion was sampled each time in duplicate, and in all cases, except the outdoor pile at Panama and the 300-pound open-air piles of New River, the sampling was done by rehandling the entire amount. In the excepted cases it was not thought fair to disturb the entire lot, and at Panama a vertical section of 10 tons only was removed each time, eight samples being taken from the 10-ton section. In the case of the outdoor lots at the navy yards a number of small portions, well distributed, were taken from each pile, mixed and quartered down.

Small lots and a fine state of division were conditions purposely adopted with the New River coal, so as to make the tests of maximum severity.

Moisture, ash, sulphur, and calorific value determinations were made on each sample, the latter by means of the Mahler [illegible] calorimeter and a carefully calibrated Beckman thermometer. The calorimetric work on all except the Sheridan, Wyo., tests has been done throughout by one man, Mr. Ovitz, and with the same instrument. All the calorific values in the tables have been calculated to a comparable unit basis, viz. that of the actual coal substance free of moisture, sulphur, and corrected ash.

The results show, in the case of the New River coal, less than 1 per cent loss of calorific value in one year by weathering in the open. There was practically no loss at all in the submerged samples, and fresh water seemed to "preserve the virtues" of the coal as well as salt water. There was almost no slackening of lump in the run-of-mine samples, and the crushed coal in all cases deteriorated more rapidly than run-of-mine.

The Pocahontas run-of-mine, in a 120-ton pile on the Isthmus of Panama, lost during one year's outdoor weathering less than 0.4 per cent in heating value, and suffered little or no physical deterioration of lumps.

The Pittsburgh gas-coal, during six months' outdoor exposure, suffered no loss whatever of calorific value measurable by the calorimetric method used, not even in the upper surface layer of the bins.

The Wyoming coal lost as much as 5.3 per cent in one of the bins during two and three-quarter years, and 3.5 per cent in the first three months. There was bad slacking and crumbling of the lumps on the surface of the piles, but where the surface was fully exposed to the weather this slackening did not penetrate more than 12 to 18 inches in the 2¾ years period.

No outdoor weathering tests have been made by the Bureau on coal of the Illinois type. Thorough tests, however, on this type, have been reported by Prof. S. W. Parr, of the University of Illinois, and by A. Bement, of Chicago, both of whom find from 1.0 to 3.0 per cent calorific loss in a year by weathering. Mr. Bement reports a slacking of lumps—in tests on small samples—of over 80 per cent in one case, and about 12 per cent in another. It is probable that in this type, as in the Wyoming coal, the slacking in a large pile would not penetrate far from the surface.

Storage under water unquestionably preserves the heating value and the physical strength of coal; but it practically necessitates firing wet coal, therefore means evaporating in the furnace an amount of moisture varying from 1 per cent to 15 per cent, according to the kind of coal. This factor is an important drawback to underwater storage with coals like the Illinois and Wyoming types, which, mechanically, retain 5-15 per cent of water after draining; but in the case of the high-grade eastern coals, if firemen are permitted, as is ordinarily the case, to wet down their coal before firing, "so as to make," as they say, "a hotter fire," the addition during storage of the 2 or 3 per cent moisture which these coals retain would be of little consequence. Submergence storage is an absolute preventative of spontaneous combustion, and on that account its use may be justified with some coals; but, merely for the sake of the saving to be secured by avoidance of weathering, there does not seem to be good ground for its use.

Spontaneous Combustion. — Losses in coal due to spontaneous heating are a much more serious matter. Oxidation—i. e., probably in the main an absorption of oxygen by the unsaturated chemical compounds in the coal substance—begins at ordinary temperature in any coal, attacking the surfaces of the particles and slowly developing heat. In a small mass of coal this slowly developed heat can readily dissipate itself by radiation, and no rise in temperature results. If radiation is restricted, as in a large pile densely packed, the temperature slowly rises. The curve of oxidation rate plotted against temperature rises with great rapidity, and when the storage conditions are such as to allow a certain point—near 100 degrees C.—to be passed, the rate of oxidation is great enough, ordinarily, so that the heat developed overbalances the heat radiated, and the temperature will rise to the ignition point if the air supply is adequate. The importance of guarding against even moderate heating in the coal, either from internal spontaneous causes or by radiation from external sources, can therefore be seen. Increased loss of heating value and of volatile matter occurs at moderately increased temperatures, even though the ignition point is not reached.

The amount of surface exposed to oxidation in a given mass depends on the size of the particles, and increases rapidly as the fineness approaches that of dust. Dust is, therefore, a dangerous thing in a coal pile, particularly if it is mixed with larger sized coal, which forms air passages to the interior. Spontaneous combustion is brought about by slow oxidation in an air supply sufficient to support the oxidation, but insufficient to carry away all the heat formed. There is a wide variation among coals in friability. In comparative rattler tests, under certain standard conditions, Pocahontas, New River and Cambria county, Pa., coals produced nearly twice as much dust—through ⅛-inch screen—as a sample from the Pittsburgh seam. This is a large factor in spontaneous combustion. Mixed lump and fine—i. e., run-of-mine with a large percentage of dust—piled so as to admit to the interior a limited supply of air make ideal conditions for spontaneous heating.

High volatile matter does not, of itself, increase the liability to spontaneous heating. A recent circular letter of inquiry on spontaneous combustion sent by the Bureau to more than 2,000 large coal consumers of the United States has brought 1,200 replies, of which 260 report

instances of spontaneous combustion, 220 of them naming the coal. Of these 220, 95 are in semi-bituminous low-volatile coals of the Appalachian region, and 55 in western and middle-western coals. This result at least shows no falling behind on the part of the "smokeless" type, and no cause for placing special confidence in these coals for safety in storage.

A serious fire in cinder-filling under a manufacturing plant in Pittsburgh was recently investigated by the Bureau, and all the evidence pointed to spontaneous combustion as the cause, induced by external heat radiated from a furnace. The cinders contained 40 per cent of carbon. A similar fire occurred two years ago in cinder-filling under a smelting plant on Staten Island, in which case the cinders contained 33 per cent carbon. Damage amounting to $20,000 was done. The cause was not definitely determined, but, from the reports of the insurance adjusters, spontaneous heating appears to be the most plausible explanation. The volatile matter in the material could not have been a factor in these causes.

Pocahontas coal gives a great deal of trouble with spontaneous fires in the large storage piles at Panama. It is reported also by several large by-product coke concerns to be more troublesome in this respect than their volatile gas coals. The high volatile coals of the west are usually liable to spontaneous heating, but they owe this property to the chemical nature of the substances which compose the coal rather than to the amount of volatile matter. Strange as it may seem, a high oxygen content in coal appears to parallel its avidity for oxygen and to promote, therefore, its tendency to spontaneous combustion.

The influence of moisture and of sulphur upon spontaneous heating of coal are mooted questions much discussed, but not very much actually investigated, and certainly not yet settled. Richters has shown that in the laboratory dry coal oxidizes more rapidly than moist, but the weight of opinion among practical users of coal is that moisture promotes spontoneous heating. The observation by the Bureau of many actual cases has not developed any instances where moisture could be proved to have had such an effect. Sulphur has been shown by these investigations to have, in most cases, only a minor influence. In a number of cases samples of heated coal from areas where the heat was greatest have been analyzed, both for total sulphur and between these, in other words the unoxidized sulphur, was in no case less than 75 per cent of the average total sulphur in the original. In other words, not more than ¼ of the total sulphur has entered into any heat-producing reaction. The possibility remains, however, that all of the sulphur which was oxidized was concentrated in one pocket of moist, flaky pyrites, and thus sufficient heat was developed in one spot to act as an igniter. On the other hand, a Boston company, using Nova Scotia coal of 3 to 4 per cent sulphur, has much trouble with spontaneous fires in storage, but a number of samples taken by the Bureau from exposed piles of this coal in which heating had occurred showed that 90 per cent of the sulphur was still unoxidized. Experiments in the laboratory in passing air over coal at 120 degrees C. have developed enough heat to ignite the coal, and no change was found in the form of the sulphur. While not entirely conclusive, these results point to a minor contribution, if any, on the part of sulphur to spontaneous heating in coal.

Freshly-mined coal, and even fresh surfaces exposed by crushing lump coal, exhibit a remarkable avidity for oxygen, but after a time become coated with oxidized material, "seasoned," as it were, so that the action of the air becomes much less vigorous. It is found, in practice, that if coal which has been stored for six weeks or two months, and has become already somewhat heated, be rehandled and thoroughly cooled by the air, spontaneous heating rarely begins again. A large power plant in New York crushes its coal to pass a 4-inch screen immediately after unloading from barges, the fines and dust, 50 per cent or more, being left in the coal to be stored. This freshly-crushed coal is elevated to iron hopper-shaped bunkers directly over the boilers, and the air temperature in these often reaches 100 degrees F. As the coal hangs on the sloping sides, sometimes three or four months at a time, it seems hardly surprising that some of the bunkers are on fire practically all of the time.

With full appreciation of the fact that any or all of the following recommendations may, under certain conditions, be found impracticable, they are offered as being advisable precautions for safety in storing coal whenever their use does not involve an unreasonable expense.

1—Do not pile over 12 feet deep, nor so that any point in the interior will be over 10 feet from an air-cooled surface.

2—If possible, store only lump.

3—Keep dust out as much as possible; therefore reduce handling to a minimum.

4—Pile so that lump and fine are distributed as evenly as possible, not, as is often done, allowing lumps to roll down from a peak and form air passages at the bottom.

5—Rehandle and screen after two months.

6—Keep away external sources of heat; even though moderate in degree.

7—Allow six weeks' "seasoning" after mining before storing.

8—Avoid alternate wetting and drying.

Avoid admission of air to interior of objects, such as timbers or irregular pile through interstices around foreign brick work; also through porous bottoms, such as coarse cinders.

10—Do not try to ventilate by pipes, as more harm is often done than good.

SLOSS-SHEFFIELD OFFICES.

Headquarters to Be Moved from Birmingham to New York.

J. L. C. Maben, president of the Sloss-Sheffield Iron & Steel Company, will change his headquarters from Birmingham to New York in a few months. His son, J. C. Maben, Jr., has been elected a vice president of the company, and will relieve his father of many of the details of operation, having had a long experience in the development of coal properties. He wil have direct supervision of the company's coal and iron mines. with headquarters at Birmingham, Alabama.

President Maben is quoted in the daily press of New York as optimistic in his view of the prospects of Southern iron. He is quoted as saying that his company sold 40,000 tons in December, and none of it under $10 a ton, although $9.50 and $9.25 have been accepted by other Southern producers. The Sloss company, he explained, had refused all large orders at the present levels, and some of the December business brought $10.25 a ton. He does not look for a rapid advance in prices of iron and steel, because of the large productive capacity of the mills and furnaces of the country.

New York-Chile Steamship Line.

Six fast steamers will be in readiness to inaugurate a new passenger line between Valparaiso, Chile, and New York when the Panama canal is completed. This information was put forth last week by the Pan-American Union at Washington.

According to advices, the South American Steamship Company will begin construction of the vessels at once, in order that the new service may start simultaneously with the canal opening. American shipbuilders, it is said, will be given an opportunity to bid for the construction of the vessels.

Failures in 1911.

Commercial failures in the United States during the year 1911, according to statistics compiled by R. G. Dun & Company, numbered 13,441 and supplied $191,061,665 of defaulted indebtedness, compared with $201,757,097 in 1910. Of the aggregate suspensions in 1911, there were 295 for $100,000 or more, against 200 in the previous year. Manufacturing failures showed an increase of 222.

Weekly Summary: Investment Securities in the Metal Industries.

STOCK AND BOND SALES AT VARIOUS EXCHANGES.

Sales include December 29, 1911, to January 4, 1912.

	New York*	Pittsburgh	Chicago	Philadelphia	Boston	Total Sales	High	Low	Last
Allis Chalmers	610	....	....	....	....	610	1½	1½	1½
Allis Chalmers pf.	1,100	....	....	....	....	1,100	8	7½	7⅞
American Can	36,610	....	2,160	....	....	36,770	12⅝	10⅝	12⅜
American Can pf	28,480	....	2,105	....	....	28,585	95⅜	90	94½
American Car & Foundry	2,120	....	....	....	....	2,120	55½	54	54⅝
American Car & Foundry pf.	200	....	....	....	....	200	106	105⅞	105⅞
American Locomotive	310	....	....	....	....	310	36⅝	36½	36½
American Locomotive pf.	200	....	....	....	....	200	34	33¾	34
American Steel Foundry	400	....	....	....	....	400	138	137⅝	137¾
American Steel Foundry pf.	100	....	....	....	....	100	100	91½	91½
American Brake Shoe & Fdry.	100	....	....	....	....	100	130	130	130
American Brake Shoe & Fdry. pf	100	....	....	....	....	225	50	49½	49½
American Shipbuilding	....	....	225	....	....	22	78	78	78
Amoskeag	....	....	....	....	22	913	100¼	99	100
Amoskeag, pf.	....	....	....	....	913	248	103¾	103¾	103¾
Baldwin Locomotive pf	138	....	....	115	....	2,100	32⅝	31	31¼
Bethlehem Steel	2,100	....	....	....	....	1,030	62	59	62
Bethlehem Steel pf	1,030	....	....	....	....	100	44½	44	44
Cambria Iron	....	....	....	100	....	105	44½	44⅜	44½
Cambria Steel	....	....	....	405	....	550	27⅝	26½	26½
Colorado Fuel & Iron	550	....	....	....	....	235	12⅜	12	12¼
Cruciple Steel	....	235	....	....	....	880	83¼	82⅜	83¼
Crucible Steel pf.	....	880	....	....	....	391	49¼	46⅛	48½
Chicago Pneumatic Tool	....	....	391	....	....	594	53¼	53	53¼
Electric Storage Battery	....	....	....	594	....	1,523	155⅞	153	154½
General Electric	1,100	....	....	....	123	800	35½	35	35½
General Motors	800	....	....	....	....	270	76	76	76
General Motors pf	270	....	....	....	....	11,180	44⅞	38¼	43
Gt. Northern Ore Prop.	14,150	....	....	10	....	1,720	109	106⅜	108½
International Harvester	1,700	....	20	....	....	100	120	120	120
International Harvester pf.	100	....	....	....	....	200	34	33⅜	33⅜
International Steam Pump	200	....	....	....	....	200	83½	83	83½
International Steam Pump pf	200	....	....	....	....	303	27⅛	26½	27½
Lake Superior Corporation	....	....	....	303	....	100	40	40	40
McCrum Howell	....	....	100	....	....	140	91½	91	91½
McCrum-Howell pf.	....	....	140	....	....	151	99	98⅞	99
M Rumely Co.	151	....	....	....	....	2,070	54⅞	53½	53¾
National Lead	2,070	....	....	....	....	185	6⅞	6	6⅜
National Enameling	....	185	....	....	....	765	27⅞	27	27⅝
National Fireproof pf.	....	765	....	....	....	200	13⅞	13⅜	13⅞
National Lead & Stamp	200	....	....	....	....	125	95½	94⅜	95½
Nat Lead & Stamp pf.	125	....	....	....	....	210	18½	18½	18½
Pittsburgh Coal	100	110	....	....	....	870	83⅞	83¼	83½
Pittsburgh Coal pf	870	70	....	....	....	900	54¼	53¾	53¾
Pressed Steel Car	900	....	....	....	....	150	102	102	102
Pressed Steel Car pf.	150	....	....	....	81	1,100	159½	159	159½
Pullman Company	....	....	....	....	....	3,910	32	31	32
Railway Steel Spring	1,100	....	....	....	....	1,315	27	26	26
Republic Iron & Steel	3,910	....	....	....	....	200	85½	84	85
Republic Iron & Steel pf	1,315	....	....	....	....	50	44	44	44
Sloss Sheffield	200	....	....	....	....	700	16¼	16¼	16¼
U. S. Cast Iron Pipe	50	....	....	....	....	150,188	51	50	50
U. S. Cast Iron Pipe pf.	700	....	....	....	....	3,525	68¼	66	68¼
United States Steel	403,195	110	1,010	35,730	10,383	55	111⅝	110½	111
United States Steel pf.	3,495	....	....	30	....	3,157	87	86	87
Utah Copper	....	....	55	....	....	20	90	70	89½
Utah Securities	....	....	....	....	....	140	117⅜	114½	115½
Virginia Coal & Coke	3,157	....	....	....	....	20	151½	151	151½
Warwick Iron & Steel	....	....	....	140	....	608	68⅛	65⅜	67⅛
Westinghouse Air Brake	....	20	....	....	....	45	116	116	116
Westinghouse Electric	529	58	....	....	....				
Westinghouse Electric pf.	....	15	....	....	....				

Quotations are based on New York Stock Exchange, when listed on that exchange. New York totals include sales on Consolidated Exchange.

BOND SALES.

	High	Low	Last
NEW YORK			
$18,000 Allis-Chalmers 5s	55	52½	55
5,000 Baldwin Loco. 5s	100¾	100½	100¾
1,000 Bethlehem Steel 5s	95¼	95¼	95¼
1,000 Bethlehem Steel 4½s	85	85	85
22,550 Int. Steam Pump 5s	92	91	91½
1,000 Int. Steam Pump 5s, 1935	91½	90	91½
1,000 Int. Steam Pump 5s, 1936	....	90	91
1,000 Int. Steam Pump 5s, 1950	....	90	91
11,000 Int. Steam Pump 5s	....	78⅝	80
1,000 N. Y. Airbrake 6s	99½	99½	99½
1,000 Int. Steam Pump 5s	98¼	98¼	98¼
28,000 U. S. Steel 5s	101½	101½	101½
1,000 U. S. Steel 5s, C. & C.	....	....	103½
5,000 Va. I. C. & C. 5s	102⅜	102	102
19,000 West. El. & Mfg. 5s	....	92	93
PITTSBURGH			
5,000 Pittsburgh Coal 5s	89¼	88¾	89¼
CHICAGO.			
5,000 West Elec 5s	102⅜	102⅜	102⅜
BOSTON			
1,000 Ariz Copper 6s	55	54	54
5,000 Ill. Steel 5s 1913	100⅜	100¼	100⅜
1,000 U. S. Steel 5s	102	102	102
BALTIMORE			
26,000 Con. Pow. 4½s	88¼	88¼	88⅜
1,000 Pa Wat & Pow 5s	90⅜	90⅜	90⅜
1,000 Lynchbg Wat 4s	101¼	101¼	101¼

BALTIMORE STOCKS.

	High	Low	Last
5 Aln. C. & I. pf.	53	53	53
755 Con. Pow. pf.	100⅛	100	100
70 Con. Coal	100	100	100
105 Pa Wat & Pow	55	54½	55
200 U. S. Steel	67	67	67

FISCAL STATEMENTS

Allis-Chalmers.

Word went out in the New York financial district on January 3, that the contemplated reorganization of the Allis-Chalmers Company, will call for an assessment of the **preferred and common** stocks for additional working capital. The bonded indebtedness will also be cut down so as to reduce fixed charges.

Regarding the $11,148,000 first mortgage 5 per cent bonds in the hands of the public on which interest was due January 1, and the $800,000 additional which has been pledged as collateral for loans, the best opinion is that the bondholders will be asked to accept new preferred stock for their bonds.

The question of a receivership for the corporation is still in abeyance. It is provided in the mortgage that foreclosure suit cannot be instituted until 90 days after the default of interest on the bonds. The January 1 coupons have already been defaulted but probably no difficulty would be found in finding a way to secure a receivership before the lapse of three months.

The bondholders' committee of the Allis-Chalmers Company, of which James N. Wallace is chairman, announces that the committee has arranged with the Central Trust Company, its depository, to advance to the bondholders the amount of the January 1 coupons upon the bonds and coupons deposited. Interest at the rate of 5 per cent will be charged by the depository.

By this action the company morally defaults on the bonds, although technically it is relieved until the next interest period, if its depository bank will carry the informal loan as long as that. The terms of the mortgage indenture allow the company 90 days' grace after the default of the interest.

A protective committee, of which James N. Wallace, president of the Central Trust Company, is chairman, has charge of the interests of the first mortgage bondholders, and this committee reported at the close of the year that an examination of the company's position having been made by expert accountants, it was found that there were assets of $9,800,000 against liabilities of $2,670,000, leaving a surplus of $7,130,000.

Liabilities did not take into account the bonded debt, nor did the assets include the plants and properties at Milwaukee, West Allis, Chicago and Scranton, which are behind the bonded debt, and are reported as "very valuable."

Neither did the liabilities include the

interest due January 1 on the bonds, of which $11,148,000 are in the hands of the public.

In making formal announcement that the January interest would be passed a statement made by Vice President Nichols explains:

The directors were of the opinion that the business could not be profitably continued in the future unless additional working capital was supplied and the fixed charges reduced, and that additional working capital could only be obtained by a readjustment of the company's capitalization. Under the circumstances, the directors felt that they were not warranted in using the cash in the treasury except for the payment of merchandise creditors, payrolls, and taxes. These current obligations will be paid as they mature, and funds are available for that purpose. It is hoped that a satisfactory arrangement can be made for the extension of the other current obligations maturing in the near future.

The resignation of Judge E. H. Gary, of the Steel Corporation, from the chairmanship of the board, was announced at the close of the year. The vacancy caused by the resignation of Judge Gary, shortly after his return from Europe last summer, has not been filled.

Cincinnati interests last week took action to protect the Bullock Electric, of that city, in case of a receivership of the Allis-Chalmers Company. The Allis-Chalmers Company owns all of the $1,500,000 of common stock of the Bullock Electric Manufacturing Company, of Norwood, O., which has operated since 1905 as a branch or department of Allis-Chalmers Company.

The capital of the Bullock Company is $3,000,000, divided into $1,500,000 6 per per cent cumulative preferred stock and and $1,500,000 common. It is understood that when the Allis-Chalmers Company bought the common stock it paid $100 a share, or par, to the Bullocks and others who held the control. There is $1,170,000 of the preferred stock outstanding practically all in the hands of Cincinnatians. The Bullock Company, as a corporation, has therefore been on a semi-independent basis, although its officers and directors are practically the same as those of the Allis-Charmers Company.

The last available balance sheet of the Bullock Company, showing its condition on June 30, 1910, gives gross assets of $5,023,695, which consisted of $2,958,937 property account, $50,000 securities owned, $1,993,758 inventories and $25,000 in cash. The liabilities show $2,670,000 of capital stock, $1,760,000 in loans, $162,815 property loan, $68,170 current liabilities, $137,910 reserves and a profit-and-loss account of $224,800.

Announcement was made in Cincinnati last week that quarterly dividend of 1½ per cent on the preferred stock, which is due January 1, has been ordered paid by the directors.

ILLINOIS' NEW LIABILITY LAW ALLOWS FOR WAIVER IN WRITING.

In the opinion of a prominent Chicago law firm the Illinois workmen's compensation law, which becomes effective in that State on May 1 of this year is constitutional and an employer who comes under its provisions will not be exempt unless he gives notice in writing to the contrary, some time before the act becomes effective, to the State bureau of labor statistics. In the opinion of Moses, Rosenthal & Kennedy an employer who becomes amenable under the act can only withdraw from its provisions by giving notice, after the act becomes effective, at the end of a calendar year. Further the notice must be on file with the bureau of labor statistics at least 60 days before the expiration of the year. It is also advised that if the employer wishes to be safe and escape he should repeat the notice every year.

The Illinois law selects certain occupations, which it names as extra hazardous and excludes workmen in other occupations from the benefits of the act. In this it resembles the New York law which was declared unconstitutional by the New York Court of Appeals last March. It differs from the New York law, however, in that the latter gave the employer no option but to accept its terms, whereas the Illinois law, following the New Jersey act, allows the employer to escape from its provisions by giving written notice 60 days in advance. To offset this the exempt employer, if he is sued for negligence, is debarred by the statute from utilizing the common law defenses of contributory negligence, act of fellow servant and assumption of risk. The act is applicable to the following occupations:

Building, maintaining or demolishing any structure, any construction or electrical work, transportation by land or water and any loading or unloading in connection therewith, operating general or terminal storehouses, manufacturing, handling or using dangerous evplosives; any enterprise in which molten metals, injurious gases or vapors, or inflammable fluids are used, manufactured, stored or conveyed in dangerous quantities; any enterprise in which statutory regulations are now or shall hereafter be imposed for guarding, using or placing of machinery or appliances, or for the safeguarding of employes, and any enterprise wherein there are extraordinary inherent risks to life and limb of employes.

In case of fatal injury a dependent, to whose support the deceased has contributed for at least five years, will be entitled to a sum equal to four times the annual earnings, not less than $3,500 or more than an average of $1,500 a year. Payment is to be made in installments equal to one-half the weekly earnings.

In case of disability, medical and and hospital service for not more than $200 or more than eight weeks, is provided, and in case of more than six days' disability there must be compensation equal to one-half weekly earnings not more than $12 or less than five dollars as long as the disability lasts.

For total disability the employe is entitled to half his annual earnings for eight years, not less than $12 weekly. If the injury lasts more than eight years the employer must pay compensation for life equal to 8 per cent of the death benefit which would have been payable if the injury had resulted in death. This compensation must not be less than $10 monthly.

The act defines total disability as total loss of sight, loss of both feet, loss of both both hands, one hand and one foot, injury to the spine resulting in permanent paralysis of legs and arms, and fracture of the skull resulting in incurable imbecility or insanity. It is expressly provided also that these definitions shall not exclude other cases.

In commenting on the constitutionality of the measure, the lawyers say that it should be borne in mind that the theory of workmen's compensation acts is that the pecuniary burden placed upon employers is merely temporary and is shifted ultimately to consumers by increase

This comment is made in connection with a discussion of the decision of the New York Court of Appeals which was to the effect that "when our constitutions were made it was the law of the land that no man who was without fault or negligence could be held liable in damages for injuries sutained by another."

Dividends Announced.

INTERNATIONAL STEAM PUMP.—Regular quarterly 1½ per cent on preferred, payable February 1 to holders of record January 20.

To Absorb Lamp Company.

Reports are current at Chicago that the Union Carbide Company will take over the Electro Lamp Company, whose stock is now owned largely by holders of the Carbide shares.

Transvaal gold yield, 1 mo., 700,000 oz.

INDUSTRIAL WORLD

Absorbed the
American Manufacturer and Iron World.

PUBLISHED WEEKLY BY THE NATIONAL IRON AND STEEL PUBLISHING COMPANY.

108 Smithfield Street, Corner First Avenue. PITTSBURGH, PA.
Bell 'Phone, 3909, Court.

Subscription Price, Per Year:

United States and Mexico.....$3.00
Canada.....$4.00
To all other countries.....$5.00
Single Copies, 10c.

E. L. CARSON.....Manager
WILL R. McCORD.....Editor.
P. L. PARKER.....Associate Editor

Entered as second-class-mail-matter at Pittsburgh, Pa., under the Act of Congress, March 3, 1879.

PITTSBURGH, Pa., JAN. 8, 1912.

Pig Iron Price Prospects.

RARELY has the pig iron market presented such a curious mixture of elements, and accordingly we find that some consumers have bought with considerable freedom for deliveries over the first quarter or first half of the new year, while other consumers have held strictly aloof and have not only not bought ahead, but have striven to reduce their stock piles to practically nothing. Of course buyers are rarely all of the same mind, but ordinarily there is nothing like the diversity of opinion which has prevailed in the past two or three weeks.

Pig iron is made from raw materials, in blast furnaces. These facts are well understood. Questions of prospective prices therefore include, among many other factors, those of prospective values and of supplies of raw materials, and of blast furnaces available.

Of the three raw materials in pig iron making, the two important ones, coke and ore, present interesting problems. Coke has been very cheap the past year, relative to the averages of most previous years. Connellsville coke at ovens, for spot shipment, has averaged about $1.50, while contracts made for the year 1911 [illegible] and $1.70, probably nearer $1.60. It looked, therefore, as if those who contracted made a mistake. When the time came around for making contracts for 1912 the opening contracts, for the first half of the year, were at $1.55 and $1.60, chiefly the latter figure, while for the whole year contracts ran a little higher. Then, before all the contracting had been done, spot coke jumped from $1.50 to $1.90. While it has since receded, it is still far above the old level. Contract prices also jumped, and one contract has been reported, for delivery only up to July 1st, at $1.85. It appears to be a question in the coke market whether or not this advanced price is going to set the pace for the remaining contracts. As to furnaces now in blast, there are few such contracts, the operating furnaces having covered in nearly all cases, but should demand for pig iron increase and additional furnaces have to be started, they would need to buy coke, and if $1.85 has be done without this influence, the starting of a few additional furnaces might bring out $2.00 coke. Pig iron has been selling on the basis of $1.50 or $1.60 coke so there would be material for a 50-cent advance in pig iron.

The other material important raw material in pig iron making is iron ore, and it presents unusual complications. First, the season price of 1911 was not maintained, being shaded by about 25 cents a ton more often than not. Second, there is a large tonnage of ore on Lake Erie docks, about equal to the highest previous record, and unlike conditions in previous years at this season, a large tonnage of the dock ore is unsold ore and the owners of course must sell it some time. Third, there has been a reduction of 20 cents in the freight rate from the MESABA range to Lake Superior, which reduction everyone expects to be carried through into a reduction in the price of ore at Lake Erie dock for the season of 1912. This would affect MESABA, but not old range ores; MESABA ores make the heavy end of the furnace mix.

The more common idea seems to be that the 1912 ore prices will be about 50 cents lower than the 1911 schedule prices, at least for MESABA. The ore would not reach furnaces until May, but if a reduction is certain, the present dock ore might start selling any day at the prospective price for new ore. That would be nearly $1.00 per ton of pig iron compared with the nominal 1911 prices, and say 50 cents as compared with the nominal 1911 prices, and say 50 cents as compared with the real prices.

It is said idle furnaces will not start unless pig iron prices advance, but it is also said that as some idle furnaces have ore already, they may wish to turn it into cash quickly, if prospects for the summer are lower ore and lower pig iron, and thus, altogether, one has a situation more interesting than instructive.

Politics and Business.

IT IS a misfortune that the people of the United States must confront as the chief element in the coming National elections a contest of men as individuals for the presidency. Rarely has the country had such great issues before it, while never has it had great isues with so little proposed to meet them. The foremost issue is of course the "trust question." We do not say it should be foremost; we need not commit ourselves, for the simple condition is that it is the foremost issue.

In a democracy like this there should be definite schools of thought by this time, with their propoganda, trying to win the majority to their respective ways of thinking. The time was that great statesmen argued such issues in CONGRESS. Some will say statesmen are dead politicians, so we never have statesmen with us; they are always dead when they are considered statesmen. Others will say that with the growth of the country the HOUSE is too large for debate and the SENATE does not count, except that the constitution still requires it to vote on legislation. One or both of these statements may be true. Grant that they are: then there is the more need for definite propoganda for the people to consider. We have had such conditions in the past. The great issues, slavery, tariff, gold or silver, etc., have had their definite sides, with much talent arrayed on each side. To-day we have the trust question, and no sides at all. The people are interested in the question of men: TAFT, ROOSEVELT, WILSON, HARMON. In so large a country sufficient brains should be developed to furnish definite schools of thought. What if our population of over 90,000,000 were less by four—those four men—should we have to do without a President? Granting that one or more, even all four, are leaders, what do they preach? Are there clear-cut issues between them? The people should be deciding between issues, not between men.

There is a reason, perhaps from one viewpoint, an amply sufficient reason, for this state of affairs, but granting it is a reason it is not an excuse. Through nearly a century and a quarter of our National life the division of the political parties, whatever their names or whatever the practical issues they contested, has been on the line of strict or loose construction of the constitution. That issue has at last died a natural death. We no longer have a strict constructionist party. The loose constructionist idea has triumphed. One may refuse to call it loose construction any longer, or may insist that it is the

change of the times, the increase in the size of the country, and the number of States, and the tremendous strides in means of communication and utilization of those means. It matters not what the theory or explanation may be; the condition is that we have no strict constructionist party and the dominant ideas to-day are such as would have involved extremely loose construction from the viewpoints of the first century of the nation.

This disappearance of the old alignment may be the reason for the present lack of cleancut preachings as to what should be done with our great issues, and particularly the greatest, but it is not an excuse. Cannot sides be definitely taken on an issue like the trust issue unless they are predetermined by an issue which never should have arisen? The strict and loose construction division was a shame and a disgrace. It was absurd that the lines of the proposed government should be drawn so clearly and with such skill, yet leaving the greatest point of all to be the bone of contention for a century; and now when we have it no longer we flounder worse than ever!

The clearest thinking, or at least the clearest speaking, has been done by trust representatives themselves. If the man in the street wishes to know the most important things that have been said on the trust issue he must go to the trusts!

The political pot has been boiling over in the past few weeks, and theories that are weird even for politics have been proposed as to what this man or that man is going to do; the surprises they are going to spring. Everything focuses upon the question as to who are going to be nominated, while one hears nothing at all as to what are going to be the issues. It ought not to be left for candidates to make the issues. The issues should make the candidates. The least uncomfortable thought, but a very uncomfortable one nevertheless, is that practical politics does not countenance the formulation of issues at this particular stage in the political game of pulling off a quadrennial election, and if that is the case there is good reason to wish that the election were decennial if not centennial.

The Tennessee Company and the Southern Market.

[From the Atlanta (Ga.) Georgian.]

In a recent paper, George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Company, the Southern subsidiary of the United States Steel Company, said that the future of iron and steel companies of the South depended upon the development of the South itself as a steel-consuming market, upon the opening of the Panama canal and the wooing of South America as its especial trade field.

The Tennessee Coal, Iron & Railroad Company is not a money-maker. It is a borrower always from its parent company. Every once in so often at the meeting of the subsidiary executives in New York, the president of the Tennessee Coal, Iron & Railroad Company appears to negotiate funds for the maintenance and operation of that vast company.

Twenty Years Ago.

OUR issue of January 8, 1892, an even 20 years ago, says that "La Metallurgie" has an article on "The transfusion of decarbonized pig iron" which describes the use of a Bessemer converter for decarbonizing pig iron for use in the open-hearth furnace. Our editor remarked that the process was not new in this country, being known as the duplex process, but the article treated the subject so intelligently and tersely that it was worthy of reproduction. Bessemer steel had been found irregular, for high class work, while the open-hearth furnace was slow, without using scrap, and scrap was becoming scarce in France. Hence the duplex process. Nowadays the Bessemer element in the duplex process is spoken of as performing the function of "desiliconizing and partially decarburizing" the metal, but in the article from "La Metallurgie" silicon is not mentioned.

Pittsburgh prices were summarized, weekly in 1891 for the important commodities, and monthly for 1890 also in the case of several. We observe that pig iron showed a constant decline and a rather considerable one, during 1891, while unfinished steel remained practically stationary and finished iron declined slightly. Connellsville coke, furnace, foundry and crushed, did not vary during the year, but in April and May the prices were "nominal, during strike" whatever that may have meant. Rails were $30 and billets averaged between $25 and $26. No. 24 gauge iron sheets declined from 2.80c to 2.75c, the drop occurring late in July. Rather a steady market!

The Westinghouse Air Brake Company had announced a reduction in the price of its "quick acting brake" from $45 to $40 per set. The Leechburg Foundry & Machine Company had shipped a five-roll Morewood tinning machine to the Irondale, O., plant of Wallace, Banfield & Company.

The Edgar Thompson Steel Works had resumed after a brief shutdown, in which an important improvement was effected. Instead of casting the ingots in a pit, as formerly, the molds were placed on cars, generally a set of eight at a time, drawn to the department by a light locomotive. Thence they went to the ingot stripper, which handled two at a time, the ingot stripper being referred to casually and evidently having been in use at the plant for a considerable time. By the new system of casting on cars the services of about 50 "skilled men" and a number of common workmen were dispensed with.

The Bellaire Nail Works, which had not made nails for a long time, was to start shortly. A few years later the name of the company was changed to Bellaire Steel Company, as the manu-

CONVENTIONS SCHEDULED FOR THE NEW YEAR.

Gasoline Producers' Association — Ft. Pitt Hotel, Pittsburgh, January 12, 1912.

American Society of Contracting Engineers.—New York, January 9.

American Society of Civil Engineers.—New York, January 17-18.

Supply Men's Association of Boiler Manufacturers (U. S. and Canada)—St. Charles Hotel, New Orleans, March 11-14.

Master Boiler Makers' Association—Pittsburgh, May 14-17, 1912. Harry D. Vought, 95 Liberty street, New York.

Ohio Society Mechanical, Electrical & Steam Engineers.—Pittsburgh, May 16, 17, 18.

American Hardware Manufacturers' Association and Southern Hardware Jobbers' Association.—Nashville, Tenn., May 28-31.

Railway Master Mechanics.—Atlantic City, June 17-19. J. W. Taylor, Old Colony building, Chicago.

Master Car Builders.—Atlantic City, June 12-14. J. W. Taylor, Chicago.

Railway Supply Manufacturers. — Atlantic City, June 17-19, 1912. J. D. Conway, 2135 Oliver building, Pittsburgh.

Railway Bridge & Building Association.—Baltimore, October 15-17.

Society of Automobile Engineers—New York, January 18-20.

Railway Industrial Assciation—Kansas City, May 12. G. L. Stewart, St. L. S. W. Rwy., St. Louis.

Air Brake Association—Richmond, Va., May 7-10. F. M. Nellis, 53 State street, Boston.

Engine & Boat Manufacturers—New York (Sixty-ninth Regiment Armory), February 17-24.

Railway Engineering Association—Chicago, March 19-21. E. H. Fritch, Monadnock block, Chicago.

facture of nails had been discontinued for good. The new Bessemer steel plant of the Ashland Steel Company, Ashland, Ky., made its first steel the week previous.

The leading editorial is on "Tin Plate Rumors," recounting two rumors, one that the forthcoming meeting of the American Tin Plate Association of the United States" would move to have it reduced. Our editor did not believe the first would be attempted, or that the second would succeed. The McKinley law, advancing the tin plate rate from 1.0c to 2.2c a pound, had passed in October, 1890, most of its provisions going into effect at once, but the tin plate increased not until July 1, 1891.

There is also discussed editorially a recent decision of "the court of last resort in England, the House of Lords," which bears considerably on our own troubles these days in regard to the Sherman Law, which was then only a year and a half old. It is not referred to in the editorial, and we think the reason was, as is being urged these days, that the Sherman Law was regarded as putting into statute our common law, taken from the common law of England. The British case was of a shipping combine, which gave a rebate of 5 per cent to those who shipped all their tea in the combine's vessels. The plaintiffs were the rival vessel owners, who claimed the scheme was adopted to injure them. The decision was that the acts were not unlawful, because if they were then most of the acts in trade competition were unlawful. The motive was simply to obtain trade, and was injurious to the others only that in getting the trade the others were deprived of it.

It will be observed that the issue was not the kind of restraint of trade we are discussing now, but only such restraint of trade as might occur by one interest appropriating, through competitive methods, the trade of another.

Our editor refers to "the years when the Western Nail Association was in active existence and was really a pool," the association being defunct at that time, and insists that there was nothing illegal about it; that the nail makers were not trying to injure the public, but merely to save themselves from bankruptcy. He says: "When these actions become illegal is when their power is used wrongfully." Whether it was the Sherman Law or the wire nail which had put the Western Nail Association out of business we do not know.

The vicissitudes of the iron trade were regarded with much more equanimity then than now. Men apparently expected to be put out of business now and then by competitive methods and not keeping pace with improvements, for our review says: "On the whole, the year 1891 has been fairly satisfactory to the iron and steel trade" and goes on to say the volume of trade was "quite large" but "active competition kept prices down to a point where margins were extremely close. Some plants not fully equipped with the most approved appliances find the balance on the wrong side of the ledger."

YEAR'S COKE OUTPUT 2,000,000 TONS SHORT OF THE TOTAL FOR THE YEAR PRECEDING.

The Connellsville "Courier," in its annual review of the coke market for 1911, gives the total output of the Connellsville region for the year at 16,105,906 tons, and total shipments 16,334,174 tons, as compared with 18,689,722 tons shipped during the year 1910. The production last year by quarters was as follows:

Quarters.	Tons
First	4,242,574
Second	3,784,349
Third	3,963,918
Fourth	4,115,065
Total output	16,105,906

Of the total output, 6,747,149 tons were from merchant ovens, and 9,358,757 from furnace ovens.

Shipments, it will be observed, exceeded production by 330,000 tons—representing that much less stock coke in the region to-day as compared with a year ago. By months, the output for 1910 and 1911 are given by the "Courier" as follows:

	Year	
	1910	1911
January	1,952,406	1,242,143
February	1,787,164	1,304,364
March	1,922,575	1,634,729
April	1,754,654	1,387,064
May	1,527,515	1,236,888
June	1,544,964	1,175,744
July	1,446,294	1,199,205
August	1,464,060	1,423,753
September	1,390,140	1,386,951
October	1,450,717	1,363,197
November	1,252,797	1,396,320
December	1,196,436	1,355,548
Total	18,689,722	16,105,906

The year 1907 holds the record for production in the Connellsville field, with a total of 19,029,058 tons.

The average price of spot furnace coke for the 12 months, 1910 and 1911 compared, the "Courier" gives as follows:

	Year.	
	1910.	1911.
January	$2.60	$1.40
February	2.25	1.47
March	2.00	1.57
April	1.80	1.58
May	1.70	1.50
June	1.65	1.45
July	1.65	1.45
August	1.65	1.53
September	1.60	1.50
October	1.55	1.50
November	1.45	1.50
December	1.50	1.68
Year	$1.78	$1.51

The year's average on spot foundry coke the "Courier" gives as $1.97, as against $2.32 for 1910.

Iron and Steel at Cincinnati.

The yearly resume of the iron and steel trade by the Cincinnati Chamber of Commerce states receipts of pig iron at Cincinnati in 1911 were approximately 440,000 tons, compared with 441,430 in 1910, a decrease of 1,430 tons. Shipments in 1911, out of Cincinnati were about 285,000 tons, compared with 289,853 tons in 1910, a decrease of about 4,853 tons. Scrap iron tonnage also was lighter, with receipts of 85,000 tons, compared with 89,400 in 1910, and shipments of 82,000 tone, compared with 84,540 in 1910.

This represents a total decrease of iron and steel receipts at Cincinnati of about 26,000 tons, and decreased shipments of about 62,500 tons. The bulk of this decrease was in the first half of the year, continuing well into the third quarter. The last quarter showed much improvement.

The total value of the pig and scrap iron handled at Cincinnati was about $6,540,000, which compares with $6,750,000 in 1910. Sales for direct delivery from mills to consumers, not included in the Cincinnati receipts, were heavier than in 1910 by an average of 5 per cent, according to reports, or about 1,100,000 tons, of a value of about $14,000,000.

The value of structural material is put at about $17,200,000, so that the total value of the iron and steel movement for the year through the Cincinnati market was about $37,700,000, fully $2,000,000 below that of 1910.

E. M. Herr on Electrical Progress.

In the annual "review number" of the Pittsburgh "Dispatch," E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, writes of electrical progress made during the year:

"The year 1911 like its immediate predecessors does not mark any very unusual period of activity in the electrical field, but rather represents a steady progress on a conservative basis.

"The use of electricity is becoming daily more and more popular and this represents a demand for apparatus that has resulted in keeping the production up to a mark a good deal above what

might have been expected due to the period of reduced activity through which we have just passed.

"The popular slogan of the present time is 'economy and efficiency,' which has had the effect of making purchasers of electrical apparatus far more discriminating and exacting than they have ever been and the manufacturer more careful to see that his product fully meets the required standard.

"Systems of cost in all lines of business are far more complete and accurate to-day than ever before, affording a detailed analysis from which the need for improvements and betterments can be determined far more accurately than was possible previously. The use of graphic recording electrical meters has been of the greatest assistance in arriving at these results.

"It is particularly noticeable in most lines that the demand has been more for the improvement of the details entering into the construction of apparatus and more highly developed and efficient designs.

"The amount of business done during the year has been somewhat less than normal, due to the period of slight depression prevalent over the country, but it has been maintained at a far from unsatisfactory level and generally above that of the other manufacturing industries. The rapid growth in popularity of the highly efficient and economical Tungsten lamp has resulted not only in vastly increasing sales of this business, but also in popularizing the use of electricity in the home and thereby stimulating the demand for electrical apparatus for supplying the current. The same remarks apply to the sale of heating devices which are doing so much toward making the lot of the housekeeper easier.

"The outlook for the future is good and I seen no reason why the year 1912 should not be an unusually bright and prosperous one from the standpoint of the electrical manufacturer."

Pennsylvania Water Supply Commission.

The report of the Pennsylvania State Water Supply Commission for 1909 has just been issued by the Commission in book form. It details the operations of the commission for the year and makes a few recommendations, among which is the following:

"Owing to the ambiguity in existing laws the commission recommends the passing of legislation defining the rights of water power corporations as to damming public streams wholly within or boundary to the State of Pennsylvania, subject to the approval of and under such limitations as may be imposed by the Water Supply Commission."

A law such as is recommended might have prevented the Austin disaster. The commission will draft such a law for enactment by the next Legislature.

Pennsylvania Industrial Statistics.

The annual report of John L. Rockey, chief of the Bureau of Industrial Statistics of the State of Pennsylvania for the year 1910 has been issued. According to the report, the State's total production of pig iron in 1910 was 11,128,858 tons, as compared with 10,721,024 in 1909. The value of the product in 1910 was $179,629,335, or $7,334,307 less than the preceding year.

Capital to the extent of $231,199,388 was invested in furnaces in 1910, and there were employed 18,773 men, or 1,800 more than the preceding year. The cost of labor per ton was 95 cents. The 16,775 employes include 5,557 Americans, 9,068 foreigners and 409 negroes. Only 42 fatal accidents occurred during the year and 3,971 non-fatal.

ELECTRIC FURNACE LININGS.

Recent Improvements Reported in Austria.

[From the "Times" Engineering Supplement, London.]

The heavy costs of repairing lining defects has been a most important factor militating against the commercial development of electric furnaces, but out of somewhat unfortunate practical experience a new combined lining has been evolved which is said to be giving excellent results.

In January, 1908, one of the principal ordnance works in Austria, the Poldihutte Tiegelguszstahlfabrik at Kladno in Bohemia, put into commission a Kjellin induction furnace of a capacity slightly over four tons. The furnace was mounted on a carriage with provision for rotation in either direction about a vertical axis. The body was therefore subjected to very considerable vibration, which resulted in frequent cracking of the magnesite lining to such an extent that renewal was necessary after some 49 charges at the most. The metallurgists of the firm therefore experimented with combination linings to such good effect that the average durability during 1909 was 200 charges per lining. Progressive improvement continued in the following year, until the third quarter of the present year one lining lasted for 491 charges. It is especially interesting to note that no repairs whatever were carried in the lining at the slag line. The linings are patented in all countries, the Grondal-Kjellin Company, Limited, holding the British and American rights.

Try a Want or For Sale ad in the INDUSTRIAL WORLD.

REVIEWS

BUREAU OF MINES PUBLICATIONS.—The Bureau of Mines announces copies of the following bulletins on hand for free distribution on request:

Bulletin 6—Coals available for the manufacture of illuminating gas, by A. H. White and Perry Barker. 1911.

Buletin 16—The use of peat for fuel and other purposes, by Charles A. Davis. 1911.

Bulletin 19—Physical and chemical properties of the petroleums of the San Joaquin Valley, California, by I. C. Allen and W. A. Jacobs, with a chapter on analyses of natural gas from the southern California oil fields, by G. A. Burrell. 1911.

Bulletin 21—The significance of drafts in steam-boiler practice, by W. T. Ray and Henry Kreisinger. Reprint of United States Geological Survey Bulletin 367.

Bulletin 26—Notes on explosive mine gases and dusts, by R. T. Chamberlain. Reprint of United States Geological Survey Bulletin 383.

Bulletin 29—The effect of oxygen in coal, by David White. Reprint of United States Geological Survey Bulletin 382.

Bulletin 30—Briquetting tests at the fuel-testing plant, Norfolk, Va., 1907-8, by C. L. Wright. Reprint of United States Geological Survey Bulletin 385.

The Bureau of Mines has copies of these publications for free distribution, but can not give more than one copy of the same bulletin to one person, nor to those who have already received the same from the Geological Survey. Requests for all papers can not be granted without satisfactory reasons. In asking for publications order them by number and title. Applications should be addressed to the Director of the Bureau of Mines, Washington, D. .C

WESTINGHOUSE CIRCUIT BREAKERS. — An attractive little folder (No. 4213) of 12 pages, illustrating and describing the advantages and construction of types B, F, H and J oil circuit breakers, has just been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

These breakers cover a wide range of voltage and capacity, and are for switchboard and wall mounting, either hand or electrical operation. One feature of interest possessed by all of the breakers described is that of the arrangement which renders it impossible to hold the breaker in a closed position on a heavy overload or short circuit.

New York State Commission asks $2,500,000 appropriation for new Sing Sing prison.

Market Conditions in Pig Iron.

THE LOCAL MARKET

Large Tonnages Pending, and Basic Market More Active.

PITTSBURGH.—The most important single inquiry pending in the market during the holidays, that of the Pittsburgh Steel Company for first half requirements at its Monessen, Pa., plant, has not been entirely closed, although the company closed with the Midland furnace of the Crucible Steel Company of Pittsburgh for 8,000 to 12,000 tons early in the week, for early deliveries. The total amount taken by the company is expected to be 50,000 to 60,000 tons for first half delivery. An Eastern Pennsylvania steel maker also is in the Pittsburgh market for 5,000 tons or more of Bessemer iron for deliveries during February, on which it is expected to close early.

The Westinghouse Machine has closed for 2,000 tons of foundry grades and is inquiring for additional tonnages for first and second quarters. A steel interest near Pittsburgh also is in the market for 6,000 tons of basic for deliveries over six months. Another inquiry pending in this district is understood to be for 2,500 tons of basic, first quarter.

A decided increase in the make by merchant furnaces in Valleys and Lake districts seems likely before the close of the month. One or two merchant furnaces are resuming. All the Carnegie Steel Company furnaces scheduled a week ago to resume are back in blast, the last of these, No. 1 at Sharon, Pa., having been fired January 4. Hall furnace of the Republic Iron & Steel Company becomes active the coming week.

The average sale price of Bessemer iron for December is given at $14.19 Valleys, compared with $14.01 for November; the average for basic, December, is $12.44, compared with $12.27 for November. Shipments for the first week of the new year were heavy.

Scattered Buying in the East.

PHILADELPHIA.—Stock taking is occupying the founders, but there is some new business in this market. A few scattered tonnages of small dimensions were under inquiry at the close of the week, and one interest requested tenders on 3,000 tons of No. 2 soft and No. 3 foundry for delivery in this territory to a large founder. Prices are unchanged, at the recent advance.

Southern Iron in West.

CHICAGO.—Southern iron is firmer in the West, the minimum being $14.35 for Chicago delivery for No. 2 Southern through first half. Northern iron continues steady, with a minimum of $14 furnace. There has been no active buying during the opening week of the year, consumers being well supplied for the early weeks of the quarter.

St. Louis district reports lively buying of Southern iron for second quarter, with a stiffening of prices for that grade.

Pig Iron for Export.

NEW YORK.—The Republic Iron & Steel Company announces the sale of 10,000 tons of Southern iron for export shipment. It is understood that the price was at the level for domestic consumers. In this district the dullness is attributed to a general shut-down or curtailment of production during the stock-taking period. While iron producers in the South announce that they have advanced their prices to $10.50 there is still iron to be had at $10 for first quarter and prompt delivery.

No Increase in Southern Output.

BIRMINGHAM.—One merchant furnace, on foundry iron, has shut down for a month or two for minor repairs. There is plenty of iron on the furnace and warrant yards to meet any demand. It is believed that the accumulated stocks will help out under the circumstances. Quotations continue to show abundant offerings for first half at $10.25, Birmingham.

A few inquiries have been received for iron to be delivered during the last half of the year, but few sales have been made so far and no effort is being made to get business for that period.

The make in January is likely to show a decrease by reason of the fact that two or three furnaces will be off and bad weather is looked for. Charcoal iron holds steadily at $22 and $22.50 per ton, with bright prospects in the future. The make has been reduced in the last 30 days something like 3,000 tons a month, if not more. There is enough charcoal iron on the yards to fill in on any improvement in the demand that might be felt.

Foundries and machine shop proprietors report but little business as yet in sight that might cause an increased force being employed.

There was no interruption in production last week in the Southern territory. The steel plants were down a few days, not more than three, counting Sunday, while blast furnaces were not closed down at all, and the only difference noted is perhaps in a few less tons of iron produced a day.

In 1910 there were 1,939,147 tons of iron manufactured in Alabama alone. With December's production estimated at 150,000 tons the make in this state should go to about 1,800,000 tons for 1911.

Cast-iron-pipe prices are strong, the demand good, and delivery steady. Already some healthy shipments of cast iron pipe have been made to the Panama canal zone.

PRINCIPAL PIG IRON SALES OF THE WEEK.

Tons.

Pittsburgh.

12,000 Basic to Pittsburgh Steel Company, January-March deliveries at Monessen, Pa., from Midland (Pa.) furnace. Price not given.

2,500 Nos. 2 and 3 Foundry to Westinghouse Machine Company, first quarter; price not given.

Cincinnati.

4,000 Malleable to Ohio consumer, first half; taken from Northern furnace, basis about $13 f. o. b. Cleveland.

1,500 Southern No. 2, first half to Ohio melter, $10 Birmingham.

500 Southern No. 2, second quarter, $10.25 Birmingham.

New oYrk.

3,000 Basic to Connecticut consumer, from Lehigh Valley furnace, first quarter, at slight advance.

1,000 Northern No. 2 to New York State melter, from Buffalo furnace.

Philadelphia.

5,000 Forge iron, March shipment, from Alabama furnaces, $9.25 Birmingham, or $14.50 delivered, March shipment.

2,000 Low Phosphorus to Philadelphia district steel maker, first half shipment.

1,000 Nos. 1 and 2X Virginia Iron, taken by Baltimore & Ohio railroad, delivery at Baltimore shops, $12 furnace or $14.65 delivered.

COKE PLANTS RESUME.

Frick Company Lights 1,500 Ovens.

It was announced during the week at Connellsville that the H. C. Frick Coke Company was starting 1,499 additional coke ovens during the week and that all the plants in operation that have been working part time are to be operated six days each week until further notice.

Other companies increased operations by 500 ovens. The W. J. Rainey Company announces that within two weeks the entire 3,000 ovens of the company will be in full blast. The company is now operating 2,200 which will go on full time.

Crude and Finished Steel Products.

AWAIT RAIL CONTRACTS.

Pennsylvania and New York Central Requirements Not Announced.

NEW YORK.—Contrary to expectations there was no announcement last week of the Pennsylvania and New York Central rail orders for 1912. The only large rail purchasers announced were the Lackawanna, 20,000 tons; the Great Northern, 36,000 tons, and the Southern Railway, 21,000 tons. The Lackawanna's 20,000-ton contract is in addition to the 20,000 tons placed under contract last year. The new order has not yet been placed, but it is likely that it will be closed before the close of the present week. The requirements will be employed both in renewals and for extensions of the line. The Canadian Pacific is also in the market for 3,100 tons.

In the Great Northern's rail order, the Lackawanna Steel Company, United States Steel Corporation, Pennsylvania Steel Company and Cambria Steel Company divided 36,000 tons of standard sections among them.

The Southern Railway bought 21,000 tons of rails from the Tennessee Coal & Iron Company. The Illinois Steel Company has an order for 2,000 tons of rails from the Minnesota, Dakota & Pacific.

Hell Gate Bridge Award.

NEW YORK.—Second section of Hell Gate bridge award, 37,000 tons, went to McClintic-Marshall Construction Company, Pittsburgh. Contract for structural work on New Graphic Arts building, New York, 2,000 tons, went to Post & McCord, of this city. Bids have been received for 7,000 tons for the Michigan Central station in Detroit, but awards await the closing of 3,000 tons of trainsheds. This latter contract will be settled within a few days, it is expected. Bridge and structural awards in New York last week amounted to about 60,000 tons.

Better Tin Plate Prices.

PITTSBURGH.—The tin plate market has stiffened sharply and many if not all the mills are adhering to the regular basis of 3.40c, offers of concessions of 10 cents on large contracts having been withdrawn.

The sheet market has improved, specifications being better while some new contracts are being made at 1.90c and 2.90c, and some mills are considering the question of advancing to 2c and 3c respectively.

CRUDE STEEL QUOTATIONS.

Billets, Sheet and Tin Bars Are Quoted Higher.

PITTSBURGH.—Billets hold firm at $20, mill, both Bessemer and open hearth, with a heavy demand in the opening days of the new year. The Carnegie Steel Company quotes forging billets at $28, Pittsburgh mill, an advance of $3 a ton since the middle of December. Some of the smaller mills are still quoting $26 and $27 on forging billets, but negotiations for prompt shipments find sellers well filled.

Sheet bars are now being generally quoted at $21. It is difficult to shade this figure, and then it can be shaded only by about 50 cents at most. Inasmuch as bars were sold as low as about $19, there has been an advance of about $2 a ton in sheet bars, and this practically eats up all the advance there has been in sheets, so that there is ample room for a further advance, above the 1.90-cent basis.

There has been no change in wire prices. Chicago reports quotations higher in structural materials and plates, some of the Western producers declining to book plates and shapes at 1.15c, except for limited periods.

New Prices on Boiler Tubes.

PITTSBURGH.—Very low prices have been made on boiler tubes, and contracts are being made at the following discounts: 3½ and 4-inch, 77½ per cent; 3-inch, 75 per cent; 2¾ and 3½-inch, 72½ per cent; 2½-inch, 70 per cent; 1¾ and 2¼-inch, 67½ per cent. These prices represent reductions of about $5 per ton. For contracts up to April 1, the 5 and 5 per cent off heretofore granted, are made in addition, but on contracts from April to July only 5 per cent is allowed.

Pipe Line for Southwest.

PITTSBURGH.—National Tube Company has taken an order for 6,000 tons of 12-inch steel pipe to be used in a 125-mile line in the Southwest.

Fuel Oil for Ships.

The Eastern Steamship Corporation which with the beginning of the new year began the operation of the Eastern, Metropolitan & Maine Steamship companies announces that the new steamers, Massachusetts and Bunker Hill, are undergoing alterations which involve the installation of fuel oil for all motive power.

THE COKE MARKET.

Spot Coke Holds a Part of Ground Gained during Holidays—Gain in Output—New Contracting.

CONNELLSVILLE. — The production of coke for the Connellsville region for the week ending December 30, was 294,189 tons, which compares with 330,793 tons for the week ending November 25. The drop through the holiday season was less severe than in the average year. The "Courier's" comparative figures for two weeks show:

	Week Ending	
Coke Produced By—	Dec. 23	Dec. 30
Furnace interests (tons)	174,104	167,709
Merchant ovens (tons)	144,581	126,282
Total output (tons)	318,685	294,189
Active ovens	26,230	26,403
Shipments (cars)	9,372	8,427

Of the prospects, the "Courier" says in its current issue:

Merchant demand is stronger, and the furnace requirements have so materially increased that the H. C. Frick Coke Company have fired 1,500 ovens this week.

Production last week fell off 24,496 tons as compared with the week before, the total being 294,189 tons as against 318,685 tons. The greatest loss was with the merchant ovens, their production decreasing 18,299 tons, the total being 126,282 tons as compared with 144,581 tons. The furnace ovens decreased 6,197 tons, their total being 167,907 tons as against 174,104 tons the preceding week.

Some Gain in Price.

PITTSBURGH.—Part of the gain in price noted in the case of Connellsville coke for spot shipment during holiday week, promises to hold. Sales were made last week of spot furnace coke at $1.75 oven. The price at the close of the week was quoted at $1.70 oven, as against $1.90, the high point reached during the holidays.

Three contracts for first half were closed just after the first of the year—about 5,000 tons a month at $1.65, about 7,000 tons at $1.70 and 10,000 to 12,000 tons at $1.85. The contract market is fairly quotable at $1.70 to $1.75, the $1.65 contract having been on an old price, and below the present market.

Prompt foundry coke is quoted at $1.90 to $2; contract foundry at $2.10 to $2.25.

INDUSTRIAL FIRES.

WILMINGTON, DEL.—Plant of United Leather Company destroyed January 2. Loss, $100,000; covered by insurance.

* * *

EAST ST. LOUIS, ILL.—Plant of American Carbon & Battery Company, Edgemont, Ill., destroyed December 28; loss $60,000, including much new machinery, recently installed. H. J. Wrape, secretary of company. Will rebuild.

Range of Weekly Quotations of Pig Iron

PIG IRON	1912. Jan. 6.	1911. Dec. 30	Dec. 23.	Dec. 16.	Dec. 9.	Dec. 2.	Nov. 25.
At Pittsburgh—							
Bessemer	15.15	15.15	15.15	15.15	15.15	15.15@15.40	15.15@15.40
Basic	13.40	13.40	13.40	13.40	13.40	13.40	13.40
No. 1 Foundry	14.90	14.50	14.50	14.50	14.50	14.75	14.75
No. 2 Foundry	13.90@14.15	13.90@14.15	13.90@14.15	13.90@14.15	14.15	14.15@14.40	14.15
Malleable	13.65	13.65	13.65	13.65	13.40@13.65	13.40	13.40
Gray Forge	13.40@13.65	13.40@13.65	13.40@13.65	13.40	13.40@13.65	13.40@13.65	13.40
Low Phosphorus	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00
Ferro Silicon, 50 per cent	70.00	70.00	70.00	68.00@70.00	65.00@66.00	65.00@66.00	65.00@66.00
Ferro Silicon, 10 per cent	22.90@23.90	22.90@23.90	22.90@23.90	23.90	23.90	23.90	23.90
Silicon Spiegel, 10 to 12 per cent	24.40	24.40	24.40	24.40	24.90	24.90	24.90
Spiegeleisen	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50
Ferro Manganese	41.95	41.95	40.45	40.45	39.45@40.45	39.45@40.45	39.45@40.45
At Virginia Furnaces—							
Basic	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. 1 X	13.00	12.75	12.75	12.75	12.75	12.75	12.75
No. 2 X	12.25@12.50	12.25	12.25	12.25	12.25	12.25	12.25
No. 2 Plain	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25	12.00@12.25
Gray Forge	12.00	12.00	12.00	12.00	12.00	12.00	12.00
At Birmingham—							
No. 1, Foundry	10.75@11.00	10.75@11.00	10.75@11.00	10.50	10.50	10.50	10.50
No. 2, Soft	10.25@10.50	10.00@10.50	10.00@10.25	9.75	9.75	9.50@10.00	10.00
No. 2, Foundry	10.25@10.50	10.00@10.50	10.00@10.25	9.75	9.75	9.50@10.00	10.00
No. 3, Foundry	9.50@9.75	9.50@9.75	9.50@9.75	9.50@9.75	9.50@9.75	9.00@9.75	9.50@9.75
No. 4, Foundry	9.50	9.50	9.50	9.50	9.50	9.50	9.50
Gray Forge	9.25@9.50	9.50	9.50	9.50	9.50	9.50	9.50
At Philadelphia—							
No. 2X Foundry	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25
Basic	14.50	14.50	14.50	14.50	14.50	14.50	14.50
Gray Forge	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50	14.25@14.50

STEEL.							
Tons of 2240 lbs., at Pittsburgh—							
Bessemer Billets	20.00	20.00	19.00@19.50	19.00@19.50	19.00@19.50	19.00@19.50	19.50@20.00
Open Hearth Billets	20.00	20.00	19.00@19.50	19.00@19.50	19.00@19.50	19.00@20.00	19.00@20.00
Forging Billets	26.00@28.00	26.00	25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00
Sheet and Tin Bars	21.00	21.00	20.00@21.00	20.00@20.50	20.00@20.50	19.50@20.50	20.00@20.50
Bessemer Steel Rails	28.0	28.00	28.00	28.00	28.00	28.00	28.00
Open-Hearth Steel Rails	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Light Steel Rails—							
25 to 45 lbs.	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00
16 and 20 lbs.	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00
12 and 14 lbs.	28.00	28.00	28.00	28.00	28.00	28.00	28.00
8 lbs.	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Bessemer Wire Rods	24.50@25.00	24.50@25.00	25.00	25.00	25.00	25.00	25.00
Open Hearth Wire Rods	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Muck Bar, all pig iron	28.00@29.00	28.00@29.00	28.00@28.50	27.00@28.00	27.00@28.00	28.00@29.00	28.00@29.00

FINISHED PRODUCTS.							
Tons of 2000 lbs., at Pittsburgh—							
Skelp Steel Grooved	23.50@24.00	23.50@24.00	23.50@24.00	23.50@24.50	23.50@24.50	23.00@23.50	23.00@23.50
Skelp Steel Sheared	24.00@24.50	24.00@24.50	24.00@24.50	24.00	24.00	23.50@24.00	23.50@24.00
Railroad Spikes	28.00	28.00	28.00	28.00	28.00	28.00	28.00
Sheets, No. 28	38.00@40.00	38.00	38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00
Galvanized Sheets, No. 28	58.00@60.00	58.00	58.00	57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00
Beams, 3 to 15 inches	25.00@26.00	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Beams, over 15 inches	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Channels, 3 to 15 inches	25.00@26.00	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Channels, over 15 inches	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Tees, 3-inch and larger	25.00@26.00	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Zees, 3-inch and larger	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00
Angles, 3 to 6 inches	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00
Angles, over 6 inches	25.00@26.00	25.00@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00
Tank Plate	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00
Boiler Plate	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00
Hoops	25.00@26.00	25.00@26.00	27.00	27.00	27.00	27.00	27.00
Bands	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00
Bessemer Steel Bars	23.00	23.00	23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00
Open Hearth Steel Bars	23.00	23.00	23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00
Common Iron Bars	25.00	25.00	25.00	24.00	24.00	24.00	24.00

and Various Finished Iron and Steel Products.

Nov. 18.	Nov 11.	Nov. 4.	Oct. 28.	Oct. 21.	Oct. 14.	Oct. 7.	Sept. 30.	Sept. 23.	1911. Jan. 7.
15.15@15.40	15.15@15.40	15.15@15.40	15.40	15.40	15.55	15.55	15.90	15.90	15.90
13.40	13.40	13.40	13.40	13.40	13.40@13.65	13.50	13.50	13.50	14.40
14.75.	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75	15.15@15.40
14.00@14.15	14.15@14.40.	14.15@14.40	14.40	14.40	14.40	14.15	14.25	14.25	14.65@14.90
13.50@13.70	13.40	13.40@13.90	13.90	13.90@14.00	13.90@14.15	13.90@14.15	13.90@14.15	14.15	14.40
13.40	13.40@13.50	13.40@13.65	13.65	13.65	13.40@13.90	13.40@13.90	13.90	13.90	13.90@14.15
21.00@22.00	21.00@22.00	21.00@22.00	21.00@22.00	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	21.50@22.50	20.00
64.00@65.00	64.00	60.00@62.00	59.00@60.00	58.50@60.00	58.00@59.50	57.00	57.00	57.00	54.50@55.50
23.90	23.90	23.90	23.90	23.90	23.90@24.90	24.90@25.90	24.90@25.90	24.90@25.90	24.90
24.90@25.90	24.90@25.90	24.90	24.90	25.90	25.90@26.90	25.90@26.90	25.90@26.90	25.90@26.90	25.00@26.00
21.50@22.50	21.50@22.50	21.50@22.50	22.50@23.50	23.50@25.50	23.50@25.50	23.50@25.50	23.50@25.50	23.50@25.50	23.90@25.90
39.95@40.45	39.95@40.45	38.95@40.45	38.95@40.15	38.65@38.95	38.95@40.45	38.95@40.45	38.95@40.45	38.45@38.95	46.45
12.00	12.00	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.75@13.25
12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75	12.75	13.75@14.00
12.25	12.25	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.50@13.00
12.00@12.25	12.00@12.25	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.25@12.50	12.50@13.00
12.00	12.00	11.75	11.75	11.75	11.75	11.75	11.75	11.75	12.00@12.50
10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	12.50@13.00
10.00	10.00	10.00	10.00@10.25	10.00@10.25	10.00@10.50	10.00	10.00	10.00	11.00@11.25
10.00	10.00	10.00	10.00@10.25	10.00@10.25	9.50@10.00	10.00	10.00	10.00	11.00@11.25
9.50@9.75	9.50@9.75	9.50@9.75	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	9.50@10.00	10.50@11.00
9.50	9.50	9.50	9.50	9.50	9.25@9.50	9.50@10.00	9.50@10.00	9.50@10.00	10.25@10.75
9.50	9.50	9.50	9.50	9.50	9.50@10.00	9.25@9.50	9.25@9.50	9.25@9.50	9.75@10.00
15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.00@15.25	15.50@15.75
14.50	14.50	14.25@14.75	14.25@14.75	14.25@14.75	14.50@14.75	14.50@14.75	14.50@14.75	14.50@14.75	15.00@15.50
14.25	14.25	14.00@14.25	14.00@14.25	14.00@14.25.	14.00@14.25	14.00@14.25	14.00@14.25	14.00@14.25	14.00@14.25

20.00	20.00	20.00	20.00	20.00	20.00	20.00	21.00	21.00	23.00
19.00@20.00	20.00	20.00	19.00	19.00	19.00@19.50	19.00	19.00	20.00	23.00
24.00	24.00	24.00	24.00	24.00	25.00	25.00	25.00	25.00	27.50@28.00
20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@21.00	20.00@22.00	21.00@22.00	24.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00	25.00@26.00
26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	26.00@27.00	27.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00
28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	29.00
25.00@25.50	26.00	26.00	26.00	26.00	26.00@26.50	26.00@26.50	26.50@27.00	26.50@27.00	28.00
25.00@26.00	26.00	26.00	26.00	26.00	26.00@26.50	26.00@26.50	26.50@27.00	26.50@27.00	28.00
28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@28.50	28.00@29.00	28.00@29.00	29.00

23.00@23.50	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
23.50@24.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	26.00@27.00
28.00	28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	28.00@29.00	29.00@30.00	29.00@30.00	30.00@31.00
37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@38.00	37.00@40.00	37.00@40.00	38.00@40.00	38.00@40.00	44.00
57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00	57.00@58.00	58.00@60.00	58.00@60.00	58.00@60.00	58.00@60.00	62.00@64.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	28.00
26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	29.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	28.00
26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	29.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	28.00
26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	26.50@27.00	27.00@28.00	29.00
25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	28.00
25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	25.50@26.00	26.00@27.00	29.00
24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	24.00@26.00	25.00@26.00	25.00@26.00	28.00
25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	25.00@27.00	26.00@27.00	26.00@27.00	30.00
27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	27.00	29.00@30.00
23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	23.00@24.00	27.00@28.00
22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	23.00@24.00	23.00@24.00	23.00@24.00	28.00
22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	22.00@23.00	23.00@24.00	23.00@24.00	23.00@24.00	28.00
24.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	24.00@25.00	27.00@28.00

Detail Prices on Finished Product in Iron and Steel.

STEEL PLATES.

Base prices, tank quality, ¼-inch thick, per 100 lbs., f. o. b. Pittsburgh:	
60 to 100 inches wide	$1.25 $1.30
Extras over base price—	
3/16-inch thick	.10
Gauges 7 and 8	.15
Gauge 9	.25
Gauges 10 and 11	.25
Circles	.20
Sketches	.10
Boiler and flange quality	.10
Marine steel	.40
Widths over 100, to 110 in.	.05
Widths over 110, to 115 in.	.10
Widths over 115, to 120 in.	.15
Widths over 120, to 125 in.	.25
Widths over 125, to 130 in.	.50
Widths over 130 in.	1.00

IRON AND STEEL SCRAP

Old steel rails, re-rolling	$12.50 $13.00
Old steel rails, remelting	12.00 12.50
Steel axles	16.00 16.50
Heavy melting scrap	12.50 13.00
Low Phosphorus	14.75 15.25
Sheet scrap	10.25 10.75
No. 1 wrought scrap	12.25 12.75
Machine shop turnings	9.00 9.25
Cast borings	8.25 8.75
No. 1 cast	12.25 12.50
Old car wheels	12.75 13.00
Old iron rails	14.25 14.75
Railway Malleable	11.75 12.00
Iron car axles	21.00 22.00

TIN AND TERNE PLATES.

Open market, f. o. b., Pittsburgh—	
Coke tins:	
14x20, 100 lbs.	$3.40
14x20, 95 lbs.	3.35
14x20, 90 lbs.	3.35
Charcoal tins:	
A grade, 14x20, I. C.	4.40
A grade, 14x20, 100 lbs.	4.25
Ternes:	
20x28, I. C.	6.60
20x28, 200 lbs.	6.30

STEEL RAILS

Fifty pounds and heavier—	
500-ton lots and over	$28.00
Car load lots	30.00
Less than car load lots	32.00
Light rails—	
12 and 14 pounds	30.00
16, 20 and 25 pounds	28.00
30 and 35 pounds	28.00
40 and 45 pounds	28.00
Relaying rails—	
Subject to inspection, f. o. b., Pittsburgh:	
Standard 50 lbs. & heavier	$23.00 $23.50
25 to 40 lbs	24.00 24.50
16 to 20-pound rails	24.00 25.00
12 pound rails	25.00 26.00

STEEL SHEETS.

Open market, per 100 lbs., f. o. b Pittsburgh—

Gauge.	Black	Galv.
30	$2.05	$3.25
29	1.95	3.00
28	1.90	2.90
27	1.85	2.75
25–26	1.80	2.60
22–24	1.75	2.40
17–21	1.70	2.30
15–16	1.65	1.95
13–14	1.60	1.95
Blue Annealed.		
10 and heavier	$1.40	$1.45
11–12	1.45	1.50
13–14	1.50	1.55
15–16	1.60	1.65

Corrugated Roofing.

Per square, 28 gauge, f. o. b., Pittsburgh—

Painted	$1.35
Galvanized	2.50 $2.55

WIRE AND NAILS.

Prices to jobbers in car load lots, per 100 lbs.; retailers 5 cents additional :

Wire nails	$1.50@1.60
Plain wire	1.30@1.45
Painted barbed wire	1.55@1.70
Galvanized wire	1.80@2.00

ALUMINUM PRICES.

No. 1 ingots, guaranteed over 99 per cent pure are held at 24c per pound in ton lots.

For small lots of 100 pounds and over advances of 3c per pound are charged.

Rods and wire .....base price 31 cents
Sheets .....base price 33 cents

BITUMINOUS COAL PRICES.

Pittsburgh district, f. o. b. mine—

	Per Ton
Mine-run	$1.15@1.25
¼-inch	1.25@1.35
1¼-inch lump	1.35@1.45
Slack	.65@ .75

	Ohio	
At Cleveland—	Pgh.	No. 8
Mine-run	$2.13	$1.95
¼-inch	2.23	2.05
1¼-inch lump	2.33	2.15
Slack	1.63	1.40

	Free-	
At Buffalo—	Pgh.	port.
Mine-run	$2.40	$2.10
¼-inch	2.50	2.20
1¼-inch lump	2.60	2.30
Slack	1.90	1.60

	Ohio	
At Detroit—	Pgh.	No. 8
Mine-run	$2.55	$2.25
¼-inch	2.65	2.35
1¼-inch nut	2.75	2.45
Slack	2.05	1.60

	Ohio	
At Chicago—	Pgh.	No. 8
Mine-run	$3.05	$2.75
¼-inch	3.15	2.85
1¼-inch nut	3.25	2.95
Slack	2.55	2.20

MERCHANT PIPE.

Base discounts, car load lots, subject to the usual variation of 5 per cent:

	Black Butt.	Lap.	Galvanized Butt.	Lap.
⅛, ¼ inch	73	..	53	..
⅜ inch	74	..	64	..
½ inch	77	..	67	..
¾ to 1¼ inch	80	..	72	..
2 inch	81	77	74	70
2½ to 3 inch	81	79	74	72
4½ to 6 inch	..	78	..	70
7 to 12 inch	..	76	..	66
Extra strong plain ends—				
⅛ to ⅜ inch	70	..	60	..
½ inch	75	..	69	..
¾ to 1½ inch	79	..	73	..
2 inch	80	76	74	70
2½ to 4 inches	..	78	..	72
4½ to 6 inches	..	77	..	71
7 to 8 inches	..	70	..	60
9 to 12 inches	..	65	..	55

The above steel pipe discounts are for "card weight." Less than carloads to destinations east of the Mississippi, two points lower.

WROUGHT IRON PIPE.

Full weight genuine wrought iron pipe car load prices to consumers; prices to jobbers one point and 5 per cent.

	Butt. Black	Galv.	Lap. Black	Galv.
⅛, ¼ inch	68	48	..	..
⅜ inch	68	58	..	..
½ inch	71	61	..	..
¾ to 1¼	75	67	..	..
2 and 2½ inch	76	69	..	..
2 inch	..	..	71	63
2½ to 4 inch	..	..	74	67
4½ to 6 inch	..	..	73	65
7 to 12 inch	..	..	71	61

Extra Strong Plain Ends.

	Butt.	Butt.	Lap.	Lap.
⅛, ¼, ⅜ inch	65	55	..	..
½ inch	70	64	..	..
¾ to 1½ inch	74	68	..	..
2 and 2½ inch	75	69	..	..
2 inch	..	..	71	65
2½ to 4 inch	..	..	73	67
4½ to 6 inch	..	..	72	66
7 to 8 inch	..	..	65	55
9 to 12 inch	..	..	60	50

Double Extra Strong Plain Ends.

½ inch	60	54	..	..
¾ to 1½ inch	63	57	..	..
2 and 2½ inch	65	59	..	..
2 inch	..	..	61	55
2½ to 4 inch	..	..	63	57
4½ to 6 inch	..	..	62	56
7 and 8 inch	..	..	55	45

MERCHANT STEEL.

Cold rolled and ground shafting, 55 per cent off, car load lots; 50 per cent off less than car load lots; delivered in base territory:

Planished tire steel	$1.30@1.40
Iron finish, up to 1½x½ in.	1.35@1.45
Iron finish, 1½x½ in. and over	1.20@1.30
Toe calk steel	1.70@1.80
Railway spring steel	1.70@1.80
Cutter shoe	1.95@2.05
Flat sleigh shoe	1.55@1.65
Crucible tool steel	7.00@8.00
Open hearth spring steel	2.05@2.30

Freight Rates on Pig Iron, Finished Steel, Coal and Coke

PIG IRON.

Pig iron, from Virginia furnaces to	Pgh.	Cin.	St. L.	Chi.	Phil.	N. Y.	Bos.
Shenandoah	$2.50	$2.35	$3.60	$3.20	$2.35	$3.30	$3.35
Bristol	4.35		3.75	4.10	3.60	4.55	4.60
Buena Vista and Roanoke	2.90	2.35	3.60	3.20	3.00	3.95	4.00
Kayula, Ivanhoe, Rural Retreat	2.90	2.35	3.60	3.20	3.40	4.35	4.40
Pulaski, E. Radford, Max Meadows.	2.90	2.35	3.60	3.20	3.25	4.20	4.25

Pig iron from Birmingham, Ala., tons of 2,240 lbs., to—	
Boston, by water	$4.60
Chicago	4.35
Cincinnati and Ohio river	3.25
Cleveland	4.35
Milwaukee and Northwest	4.75
New York, all rail	5.95
New York, rail and water	4.25
Philadelphia, all rail	5.00
Philadelphia, rail and water	4.00
Pittsburgh	4.90
St. Louis	3.75
To Pittsburgh from—	
Dunbar furnaces	.85
Kittanning furnaces	.60
Scottdale furnaces	.85
Valley furnaces	.90
Wheeling	.90
Valley furnaces to—	
Cleveland	.90

PIG IRON AND BILLETS.

Pittsburgh to	Pig iron.	Billets.
Baltimore	$2.15	$2.30
Buffalo	1.75	1.80
Boston	2.85	3.00
Chicago	2.80	3.00
Cincinnati	2.20	2.40
Cleveland	1.40	1.50
Columbus	1.60	1.90
Dayton	1.85	2.20
Detroit	2.15	2.25
Erie, Pa.	1.40	1.50
Indianapolis	2.20	2.65
Louisville, Ky.	2.80	3.00
New York	2.45	2.60
Philadelphia	2.25	2.40
Portsmouth, O.	2.10	2.50
Rochester	1.80	1.90
Richmond, Va.	2.65	2.80
Syracuse	2.10	2.20
St. Louis	3.50	3.80
Steubenville	.80	.90
Toledo	1.75	1.95
Wheeling, W. Va.	.90	1.00
Youngstown	.90	1.00
To Pittsburgh from—		
Mahoning and Shenango valleys		1.00
Wheeling		1.00

COKE.

From Connellsville region, per 2,000 pounds, to—	Fur.	Fdry.
Buffalo	$1.65	$1.90
Baltimore		2.15
Cleveland		1.65
Columbus		1.65
Cincinnati		2.10
Chicago		2.50
East St. Louis		2.80
Hamilton, Ont.		2.20
Joliet		2.65
Louisville		2.65
New York		2.85
Pittsburgh	.75	.80
Philadelphia		2.15
Richmond, Va.		2.95
Toledo	1.95	2.25
Valley furnaces	1.35	
Milwaukee	2.55	2.75
Detroit	2.10	2.25

TIN PLATE.

Per 100 lbs., Pittsburgh to—	C.L.	L.C.L.
Boston, Mass	18	21
Albany, N. Y.	16	19
Baltimore, Md.	14½	17½
Birmingham, Ala.	41	68
Cleveland, O.	10	13
Columbus, O.	12	15
Cincinnati, O.	15	18
Concord, N. H.	18	21
Charlotte, N. C.	39	61
Charleston, S. C.	33	70
Charleston, rail and water.	23½	31
Covington, Ky.	15	18
Chattanooga, Tenn.	33	65
Chicago, Ill.	18	21
Canadaigua, N. Y.	13½	16
Des Moines, Ia.	37½	48½
Detroit, Mich.	15	18
Denver, Colo.	84	1.18
Dover, Del.	17	20
Buffalo, N. Y.	11	13
East St. Louis	22½	26
Hartford, Conn.	18	21
Indianapolis, Ind.	17	19½
Louisville, Ky.	18	21
Montpelier, Vt.	21	24
Minneapolis, Minn.	32	42
New York	16	19
Norfolk, Va.	20	24
Natchez, Miss.	32	61
Portland, Me.	18	21
Providence, R. I.	18	21
Philadelphia, Pa.	15	18
Richmond, Va.	20	24
Rochester, N. Y.	11½	13½
Syracuse, N. Y.	13½	16
St. Louis, Mo.	22½	26
Terre Haute, Ind.	18	21
Topeka, Kan.	54½	68
Trenton, N. J.	16	19

FINISHED PRODUCTS.

Finished steel products, including plates, structural shapes, merchant steel and iron bars, skelp, pipe, fittings, hoop and cotton ties, plain and galvanized wire nails, rivets, spikes and bolts (in kegs), black plates, except planished, chain, etc., per 100 lbs.:

Pittsburgh to—	
Albany	.16
Buffalo	.11
Boston	.18
Baltimore	.14½
Canadaigua	.13½
Cleveland	.10
Columbus	.13
Cincinnati	.15
Chicago	.18
Harrisburg	.14½
Louisville	.18
New York	.16
Norfolk	.20
Philadelphia	.15
Rochester	.11½
Richmond	.20
Scranton	.15
St. Louis	.23
Washington	.14½
To Pittsburgh from—	
Mahoning and Shenango valleys	.05
Wheeling	.05

COAL.

Coal rates from mines—	
To Ashtabula	$1.00
To Allegheny, Pan Handle Ft. Wayne tracks	.43
To Allegheny, West Penn tracks	.48
To Allegheny, B. & O.	.35
To Pittsburgh, P. R. R. Main Line.	.40
To Pittsburgh, B. & A. V. Div.	.48
To Pittsburgh, B. & O.	.23
To Valleys	.70
To Buffalo	1.25
To Cleveland	1.00
To Detroit	1.40
To Chicago	1.90
To New York, gross ton	2.25
To Philadelphia, gross ton	2.00
From Freeport—	
To Buffalo	1.10

For Lake shipments—	Cargo.	Fuel.
To Ashtabula	.88	.98
To Cleveland	.88	.98
To Erie	.88	.98

West Virginia rates from mines—	
To Chicago	1.90
To seaboard points, gross ton	1.80
From No. 8, f Ohio—	
To Cleveland	.98
To Chicago	1.65
To Detroit	1.15

New Construction and Extensions

Iron and Steel.

Pittsburgh.—Ft. Pitt Bridge Company received general contract for addition to plant of West Penn Steel Company Brackenridge, Pa., to consist of extention 80x436, to present sheet mill building. Extension to contain three new hot mills and 12 stands of cold rolls, increasing hot mill capacity in the plant to 10. Work to begin February 1.

Youngstown, O. — Republic Iron & Steel Company will take bids shortly on addition to butt weld pipe department at Lansingville (O.) mills. Estimates not yet made public. Company's own engineering department preparing plans.

Cleveland.—J. C. Campbell, 2202 East Eighty-fourth street, received contract 2-story brick and steel office building. Central avenue near East Sixty-sixth street, for the Perfection Spring Company; cost $30,000. Foundation work in progress.

Pittsburgh.—Allegheny County Light Company took out permit for erection of gas holder on Northside, to cost $300,000. Contract to Riter-Conley Manufacturing Company.

Toledo, O. — Toledo Furnace Company, Toledo and Cleveland, have asked council for vacation of Bakewell street, East side, preparatory to extensions to plant. Rumored that company contemplates installing by-product coke ovens, as announced several times.

Peoria, Ill. — Through S. A. Griffiths, a promoter representing the Seevers Manufacturing Company, of Oskaloosa, Ia., a deal has been closed for 21 acres in South Peoria and the Seevers company expects to begin the construction of a modern steel and concrete plant for the manufacture of structural steel. In addition to structural steel the Seevers Company also manufactures steam and hot water boilers, stationery engines, castings, etc.

Atlanta, Ga. — Atlanta Steel Company's board of directors in considering plans for $300,000 addition to double size of plant. Another open hearth furnace will be installed.

Concrete, Brick, Clay.

DuBois, Pa. — The Bohemian Art Pottery Company is taking bids on constructing a three-story brick pottery, from plans drawn by Architect William H. Overdorff, 811 South Brady street.

Bridge; Structural; Ironwork

Erie, Pa.—Bids will be received by the Commissioners of Water Works of the city of Erie until January 12, for constructing a steel standpipe, 25 feet in diameter and 80 feet high, in accordance with plans and specifications of Chester & Fleming, Consulting Engineers, Pittsburgh.

Dayton, O.—City has plans in preparation for steel girder bridge 55 feet long, 60 feet wide, work on which will be commenced in spring. Fred J. Collarius, city engineer.

Pittsburgh—Government contract to remove the old lock gates and to replace them with new modern iron gates at the Davis Island dam has been awarded to the Penn Bridge Company, of Beaver Falls. Their bid of $29,484.22 was the lowest submitted. The old lock gates, which are of wood braced with iron bands, were installed years ago.

Cincinnati, O.—Contract for Ludlow avenue viaduct will be let in three sections. Awards made by Service Director Sundmaker give Strack the superstructure, Glandorf the piling and Kirchner the substructure contract. The total cost of the viaduct is to be $259,585. Cranford Construction Company was the lowest on the lump bid, but this concern was $7,500 higher than the aggregate bids of the contractors who were awarded the job.

Pittsburgh, Pa. — Residents of boroughs of Glassport and Camden, Allegheny county, have petitioned county commissioners for new bridge between the two towns.

Machinery and Tool.

Chambersburg, Pa. — Chambersburg Chamber of Commerce has secured subscriptions for $21,200 for the purpose of removing the Quincy Engine Company's plant from Quincy to Chambersburg. Stock subscriptions were taken for shares at $50 each. It is desired to secure $40,000 in subscriptions. T. B. Wood's Sons Company offers to sell its plant with equipment, etc., for location for engine company.

Mt. Holly, N. J.—Ballinger & Perrot are preparing plans for a manufacturing plant for the Auto Gas Engine Company to cost $100,000.

Punxsutawney, Pa.—Local parties, who are preparing to organize company and take out Pennsylvania charter have purchased site at Cherrytree, Indiana county, on which will be erected a plant for the construction of gas engines to be applied to operation of mine fans. A Philadelphia plant will be moved to Cherrytree as being central to the coal field to be served.

Cincinnati, O. — Automatic Machine Manufacturing Company and the Interurban News Distributing Company have been merged into a $3,000,000 corporation, to be known as the Automatic News Distributing Company. The company has a plant on East Fourth avenue for the manufacture of machines for the automatic sale of newspapers on public conveyances, in hotels, etc., John E. Beggs, of Terre Haute, a distiller, is the president, and W. F. Clark, of Pittsburgh, former director of the Standard Oil Company, is vice president. J. R. Sanborn, formerly with the Art Metal Work Company, of New York, has come here to take charge of the manufacturing end.

Toronto, Can. — Mayor Geary announces that city of Toronto will endeavor to obtain plant of Canadian Locomotive works, at present situated in Kingston, Ont.

Buffalo, N. Y.—Certificate of incorporation was filed in county clerk's office by F. X. Muller Hose Coupler Company, capitalized at $100,000, to do a general iron and metal manufacturing business. Directors are Frank X. Miller, Joseph Bronold and Crescentia Hurley.

Public Works; Municipal, Etc.

Homestead, Pa. — Treasury Department, Washington, D. C., awarded contract for construction of Homestead postoffice building to John G. Uncapher & Son of Minerva, O., at a stated bid of $63,490, the lowest submitted.

Brookville, Pa. — Brookville borough took over the plant of the Brookville Water Company. The consideration was $116,500. Recent improvements include a new reservoir and a new filtration plant.

Schenectady, N. Y. — Common council on December 27 adopted ordinance authorizing construction of one-unit water storage reservoir of 10,000,000 gallons capacity to cost $300,000, also construction of distributing pipes connecting reservoir with city water system. General Manager M. Webb Offutt, of Schenectady Illuminating Company, announced company will replace present electric pumps at the Rotterdam wells with two of 12,000 gallons capacity per day, the contract capacity. Present pumps were installed at the solicitation of the General Electric Company, with a view in time of placing the electric pumps on the market. Since then, in 1904, the pumps have been improved and

now are in use in Cincinnati, Buffalo, Duluth and other cities.

Parkersburg, W. Va.—City council has authorized mayor and superintendent of waterworks to confer with Engineer George H. Leland, on a proposal for supplying plans and specifications for a reservoir to be built on Boreman hall, and necessary pipe and connections. Estimated cost of such a reservoir would be about $30,000 and the pipe for the connections, about $40,000.

Columbus, O.—D. W. McGrath, New First National Bank building, Columbus, is low bidder for the erection of the museum and library building, for the Ohio State University, Columbus, as planned by Architect Joseph N. Bradford, Brown Hall, Columbus. It is likely that the building will be of reinforced concrete construction.

Cleveland, O. — New bids are to be taken for the erection of a high-pressure pumping station, for the City of Cleveland.

Bradford, Pa. — The State of Pennsylvania Armory Board, Harrisburg, Pa., will take bids at once on the erection of a two-story brick armory 63x90 feet, from plans made by Architect A. P. Mount, Traction building, Corry.

Yellow Creek, O. — The Board of County Commissioners, Jefferson county, contemplates the building of a Children's Home, to be built of brick, hollow tile and reinforced concrete, measuring 110x110 feet, two stories and basement.

Dayton, O. — Treasury Department, Washington, D. C., awarded general contract for the erection of the new Dayton, O., post office building to the Charles McCaul Company, Philadelphia, its bid being $417,581. This price does not include the plumbing, heating, electric wiring and elevator system.

Erie, Pa. — Waller-Diefendorf Company, Erie, has been awarded general contract for the erection and equipment of a municipal water works for fire protection at Wampum, Pa., at a cost of $9,500. Cast iron pipe and 20 fire plugs will be installed. F. M. Butler, New Castle, Pa., is consulting engineer.

Hardware, Sheet Metal, Etc.

Philadelphia. — Day & Zimmerman, architects, are taking bids on plans for manufacturing plant, at Front street and Erie avenue, for Hess-Bright Manufacturing Company, manufacturers of ball bearings. The plans show a two-story brick and terra cotta factory building, 208x213.

Moundsville, W. Va.—General contractor, J. W. Long has started work on building of new Novelty Stamping Company's plant in Shadyside; plant will be 200x400. W. C. Stewart and W. F. Hughes, Moundsville, proprietors.

Power, Hydro-Electric.

Barnesboro, Pa.—Citizens Water Company will build small pumping station, storage reservoir, pipe lines, etc. A. B. Crichton, Title & Trust Building, Johnstown, Pa., engineer.

Noblesville, Ind.—C. R. Heath, president Noblesville Gas & Improvement Company, is negotiating for the purchase of the Tipton Gas Company, which supplies the city of Tipton, Ind., with natural gas. Company will control supply of natural gas in Noblesville, Tipton, Sheridan, Westfield, Carmel, Zionville, Lapel, Lebanon and Windfall, Ind. Plan is to erect central artificial gas stations with a view to supplying the various places with artificial gas in event supply of natural gas fails.

Burnside, Ky.—Promoters of Cumberland Electric Light, Heat & Power Company, to be incorporated shortly in Kentucky with object of supplying power to Louisville, Lexington, Frankfort and other points, have options on property at Cumberland Falls, Ky., for hydro-electric plant on Cumberland river at that point, a few miles above Burnside. Company controls Federal franchise for use of water power. Dam will be 90 feet high. Company will have an outlet for coal, iron and timber interests which they already have options on from the Bauer Cooperage Company, of Lawrenceburg, Ind., and L. E. Bryant, of Danville, Ky.

Hooversvile, Pa.—Hooversville Water Company will build water supply system; plans in hands of O. I. Thomas, Lincoln building, Johnstown, Pa.

Albany, N. Y.—Adirondack Electric Power Corporation, capital $12,000,000, incorporated here, headquarters at Saratoga, to acquire properties of Hudson River Water Power Company and other corporations, and extend present plants of up-State hydro-electric companies Incorporators include Senator Edgar T. Brackett, Saratoga, N. Y.; Wilson A. Shaw and Charles E. Willock, Pittsburgh. Stone & Webster Corporation, Boston, Mass., will act as manager for new company. [See news columns, this issue].

Harrisburg, Pa. — Paxtang Electric Company and Harrisburg Light, Heat & Power Company, local concerns, have completed merger plans, contingent on passage of new franchise ordinance in council; will spend $500,000 in extensions to plant if merger is perfected. [See news columns, this issue].

Wilkes-Barre, Pa. — Engineers of Spring Brook Water Supply Company are making surveys for new dam on the Spring Brook watershed, which will provide a reservoir with a three billion gallon capacity. The dam, which will be 80 feet high, will be built on what is known as the Richards' dam site at Spring Brook Corners, near Moosic. It will be the fourth of a series of dams on this watershed and will be located on a higher elevation than the three others. Work will commence in spring. Plans not yet complete.

Warehouses, Business Bldgs.

Pittsburgh. — Ft. Pitt Hotel Company is having plans prepared for addition of six stories to main building of hotel, top floor to be given over to banquet hall with seating facilities for 1,800 persons, floor space of hall 160x110. Jansson & Abbott, Pittsburgh, architects. Work to begin about June 1. Improvement will add 400 rooms to hotel.

St. Louis, Mo. — Work on administration building of the David Rankin, Jr., School of Mechanical Trades will be started the first of next week. This building will be of brick and granite and will be the second of a group of buildings as originally planned. The new building will be erected fronting on Finley avenue and connecting with the present building. The new building will cost $225,000, and will be built in three sections, one 83x193 feet and two other sections 49x113 feet. All sections will be connected. It will be three stories high and will consume a year in construction. The new building will contain 38 rooms for executive offices, bricklaying, carpenter, plumbing, machine and other shops, as well as a gymnasium and baths. Eames & Young, architects, drew the plans, while James Stewart & Company, contractors, will have charge of its construction.

Wheeling, W. Va. — Bids will be received coming week by Architect Edward B. Franzheim, Schmulbach building, for extension of McLure hotel annex, which will be seven stories high and in conformity with the new buildings. Addition will be 50x110, and fireproof.

Pittsburgh.—Fort Pitt Bridge Company, House building, took general contract one-story steel warehouse on the Southside for the A. M. Byers Company, 100x150 feet.

Pittsburgh.—Plans are under way by Architects H. E. Kennedy & Company, Second National Bank building, Cincinnati, for one-story brick, steel and cut stone theatre building, 90x133, to be built in Schenley Farms district for Pittsburgh parties. Bids will be asked about January 15.

Cleveland, O. — John Woide, 1797

East Thirty-fifth street, received contract to build one-story addition to warehouse of Mechanical Rubber Company.

Burgettstown, Pa. — Plans for ice storage building, 45x70, are being prepared by Architect C. W. Hodgdon, 810 Penn avenue, Pittsburgh, for Burgettstown Milling & Plate Ice Company. Building will be of brick with steel truss frame.

Mansfield, O. — Martin Hardware Company will erect steel and frame warehouse, North Walnut street, to cost $18,000. Architect, Vernon Redding, Bird building, Mansfield.

Middletown, O. — American Rolling Mill Company has broken ground for two-story office building, to cost $5,500. General contract to Caldwell & Iseminger, Middletown.

Philadelphia—Contract for placing approximately 1,500 Raymond concrete piles for foundations, Webb terminal warehouse building, Walnut street and Delaware avenue, was awarded to Raymand Concrete Pile Company. Irwin & Leighton, general contractors.

Columbus, O.—Green-Joyce Company has purchased a site in North Front street, 95 by 187½, to erect fireproof building to be used exclusively for themselves. Present building at Chestnut and High streets will be abandoned, it being too valuable for wholesale purposes.

Sharon, Pa.—Sharon Building Company, Limited, has taken over the property of the old Sharon Spoke Company, South Irvine and Budd avenues. Frame two-story carpentering shop and warehouse will be built.

Cincinnati, O.—Architects Rapp, Zettel & Rapp, Johnston building, have plans under way for a light manufacturing and loft building for the Board of Trustees of the University of Cincinnati. The building will be 36x100 feet, three stories.

Pittsburgh — Carnegie Technical School received estimates Jan. 2, 1912, on constructing a four-story brick, terra cotta and granite School of Applied Design, in Schenley Park, from plans drawn by Architect Henry Hornbostel, care Carnegie Technical Schools. Cost $350,000.

Railroad Structures.

Parkersburg, W. Va.—Baltimore & Ohio Railroad Company has completed plans for erection of central freight terminal in this city.

Foundry and Machine.

Buffalo, N. Y. — Tuttle & Bailey Manufacturing Company, at present occupying site on Jarvis street, Bridgeburg, will erect large foundry in the south ward. Five-acre site has been purchased.

Morgantown, W. Va.—Chrisman & Goodwin, who operate a foundry on Beechurst avenue will begin the erection of an addition to double capacity of plant.

Philadelphia. — Stearns Castor will erect foundry and forge addition, 30 by 50, for the Electric Service Supply Company, to adjoin its recently completed fireproof plant at Seventeenth and Cambria streets.

Miscellaneous.

Moundsville, W. Va. — Stockholders of Fostoria Glass Company, of this city, voted on January 4 for increase of the stock of the company to $1,000,000 and adopted a resolution requesting the board of directors to offer a portion of the new stock for sale. Company is contemplating building a new furnace for blown ware.

Muncie, Ind. — Announcement is made by local real estate dealers that new branch of the Warner Manufacturing Company's plant at Toledo, Ohio, (manufacturers of electrical supplies, gears, etc.), will be built here. Warner company has been employing about 75 men for the past two years in the old building of the Warner Arc Light Company. About 200 men will be employed in the new branch on Perkins avenue. Building to be completed April 1.

St. Louis. — Gerst Brothers Meat Company, 2823 Luckey street, will erect a two-story brick building, to be finished in the early spring; will be used as a packing house and will contain a modern cooler. The executive offices of the company also will be in the new building. The present building, which is a one-story frame structure, will be converted into a packing house exclusively. Changes to cost $40,000.

Erie, Pa.—Paasch Brothers, boat builders, owning a section fronting on the east public dock will commence the erection of a greatly enlarged plant in the spring. New building will consist of four floors, with a frontage on the public dock of 62 feet and a depth of 40 feet. It will have a floor space of 10,000 square feet, with water ways at either end, and will be equipped with additional machinery.

Bowling Green, O. — Toledo Sugar Company has purchased from Connecticut Mutual Life Insurance Company 37.27 acres adjoining southeast portion of Rossford and will break ground this month for plant to cost $1,500,000. LaRue Construction Company of Detroit, has the work. Plant is to be in readiness for receipt of sugar beets and their manufacture September 1, 1912. Company paid $22,275.60 for land.

Rome, Ga.—Bowle Stove Foundry will resume operations about January 15. The insurance from the fire of December 20 is being adjusted. The damage is in the neighborhood of $5,000.

Boston, Mass.—Aberthaw Construction Company, Boston, has completed one and two-story portions of concrete beam house of American Hide & Leather Company, at Lowell, Mass. Lockwood, Greene & Company, Boston, architects and engineers.

Parkersburg, W. Va.—Standard Milk Bottle Company, now building a No. 2 plant at Mt. Vernon, O., contemplates erection of a No. 3 plant at Parkersburg, adjoining its No. 1 works here. Plans will be ready during the spring.

Canadian Extensions.

[Condensed from "Canadian Foundryman."]

Wingham, Ont.—The ratepayers passed the by-law to grant a loan to the Western Foundry Company to construct a new building and instal a new plant.

Toronto — Massey-Harris Company has taken out a permit for the erection of a core-room on King street, West, near Shaw, three stories, cost $25,000.

Fort William, Ont.—Frank V. Samwell, of Guelph, will establish foundry here for manufacture of wrought iron pipe. Plant and equipment will cost about $200,000, of which city is asked to loan $100,000.

North Battleford, Sask.—A newly incorporated company, William Clark & Company, have secured site and will erect foundry and shops 40x80 feet.

Fredericton, N. B.—Albert C. Smith, of the Smith Foundry Company, placed orders for machinery to be installed in new foundry building of company; expected foundry will be in operation in February.

Hespeler, Ont. — Hall-Zyrd Foundry Company let the contract and started work on addition. New building will be 100x60, one story, and will be used as a machine shop.

Winnipeg—Canada Metal Company, Toronto, has found it necessary to build a factory in Winnipeg. W. G. Harris, Jr., vice-president of the company, is in charge of installation of plant here.

Wingham, Ont. — Western Foundry Company is making preparations for erection of foundry buildings on site immediately north of present premises.

Try a Want or For Sale ad in the INDUSTRIAL WORLD.

Charters to New Corporations.

West Virginia.

Lynch Development Company, Clarksburg, to develop real estate, operate for oil and gas and to operate manufacturing industries; $1,000,000. E. V. Lynch, G. E. Martin, E. B. Hardesty, J. L. Morris and G. C. Irvine, all of Clarksburg.

Chase Oil & Gas Company, Sistersville, to drill for oil and gas in Lincoln district of Tyler county; $10,000. Joseph McKay, Mary C. McKay, C. A. McKay, J. J. McKay and Mabel G. McKay, all of Sistersville.

Kimball Light, Power & Water Company, Dayton, O., to construct electric light and power plant and water works in the town of Kimball, McDowell county, this State; $50,000. Charles H. Warford, B. Burns, Charles H. Witte, Homer F. Miller, George Wright, all of Dayton, O.

Nocturnal Gas Company, Buckhannon, W. Va., to drill for oil and gas and market it in North View, Harrison county; $8,000. Charles P. Lynch, H. E. Young, Leslie Brooks, J. H. McCray, V. S. Lynch, all of Buckhannon.

Brown Oil & Gas Company, Buckhannon, W. Va., to drill for oil and gas in Hackers Creek district of Lewis county, on what is known as the J. C. Post lands; $16,000. J. M. King, Eugene Brown, L. H. Trippert, H. O. Talbot, I. R. Hall, all of Buckhannon.

Hard Luck Gas Company, Buckhannon, W. Va., to drill for oil and gas on Peter I. Lynch lands in North View, Harrison county, and market same; $8,000. J. M. King, Eugene Brown, William Post, C. D. Munson, L. H. Trippett, all of Buckhannon.

Peoples Electric Light, Ice & Water Power Company, Weston, W. Va., to manufacture ice, operate cold storage plant, water works to furnish city of Weston, etc.; $100,000. M. S. Holt, J. M. Foster, George A. Hatzel, Charles M. Snaith, Ross L. King, all of Weston.

Massachusetts.

Bennett Manufacturing Company, Boston; metals of all kinds; $150,000. Ernest L. Shubert, Auburndale; Fred L. Drew, 69 Pinkey street, Boston; Edgar M. Parker, 86 Howard street, Waltham; Thomas F. Sheldon, 97 Milk street, Boston.

Boston Lightning Rod Company; Boston; dealing in lightning rods; $10,000; Henry L. Willard, Jr., Elm street, Cohasset; Henry L. Willard, 256 Hyde Park avenue; George C. Willard, 10 Park street, Hyde Park.

Bay State Grinder Company, Worcester; patents and patent rights; $15,000. Winfield S. Griffith, 44 John street; Edson A. Chamberlain, 1 Woodlawn avenue; William E. Carroll, 7 Richmond avenue, all of Worcester.

Boston Brass Company, Boston; dealing in brass and all metals; $20,000. George F. Hickmott, Jesse Y. Baker, 36 Oliver street, Boston.

Pennsylvania.

Chemical Wood Company, manufacture steel, iron or other metal; manufacture of lumber and production of charcoal, alcohol and other chemical products from wood and timber and trees; Smethport, Pa.; $500,000. R. W. Hilton, Smethport, Pa.; R. E. Burdick, Smethport, Pa.; C. D. Comes, Smethport, Pa.; F. D. Gallup, Gallup, Smethport, Pa.; J. M. Hilton, Bradford, Pa.

Duquesne Construction Company, Pittsburgh; $5,000; general engineering, contracting and construction business, etc. Frank W. McCarthy, Joseph Dunn and C. W. Gibbs, all of Pittsburgh.

Ozone Engineering Company, Philadelphia; $5,000; making and selling ozonizers, and general electrical devices; mechanical engineers. Louis F. Bruce, Tenth and Clinton streets, Philadelphia; Russell Spaulding, 226 Central Park, New York; Jacob Liffman, 2742 North Twelfth street, Philadelphia.

Apollo Extension Step-Ladder Company, Apollo; $5,000; making and selling all kinds of ladders. E. A. Townsend, president; C. A. Replogel, vice president; J. E. Gallegher, secretary; W. F. Pauly, treasurer; Edwin L. Dively, attorney, all of Apollo, Pa.

Junction Coal & Contracting Company, Pittsburgh; $7,500; dealing in coal, coke and other fuels; builders' supplies, etc. W. R. Thomas, William E. Miller, both of Pittsburgh, and D. J. Gwilym, Wilkinsburg, Pa.

Columbia House Wrecking Company, Columbia, Pa.; $5,000; buying, wrecking and selling of buildings, etc. Patrick Moriarty, William W. Fairer, Milton Crumbling, Harry Abendschein, all of Columbia, Pa.

Vosburg Company, DuBois; $10,000; buying and selling timber and timber lands, manufacturing lumber and selling the same. John E. DuBois, Arthur W. Vosburg, W. C. Pentx, all of DuBois, Pa.

Duntley Products Company, Erie, Pa., manufacturing and selling vacuum cleaners, air washers and devices and parts thereof. James Burk, Spencer Van Cleve, and Henry E. Fish, all of Erie, Pa.

Edwin E. Hollenback, Philadelphia, Pa.; $10,000, to do a general contracting and excavating business; grading, paving, constructing sewers, highways, bridges, railroads, etc. Edwin E. Hollenbeck, 630 North Fifty-sixth street; Edgar M. Wamhold, 1505 Erie avenue; James F. Boylan, 334 North Fifty-second street, all of Philadelphia.

Pittsburgh Motor Truck Company, Pittsburgh; $5,000; manufacturing, selling and dealing in motor trucks, etc. William C. Jacobs, James J. Cosgrove, J. Lee McKnight, all of Pittsburgh.

North Whitehall Light & Power Company, Allentown, Pa.; $5,000; supplying light, heat and power. R. P. Stephens, Charles N. Wagner and Charles M. Walters, all of Allentown, Pa.

Washington Township Electric Light & Power Company, Allentown; $5,000; supplying electricity to the public for heat, light and power, etc. R. P. Stephens, Charles M. Wagner and Charles M. Walter, all of Allentown.

River Pipe Line Company, Pittsburgh, Pa.; $10,000; transporting, storing and shipping petroleum, operating pipes, tubings, tanks and other machinery necessary to fully carry out its rights; also the right to enter upon, take and occupy land and property on route of said lines as follows—along the Ohio river in Robinson Township, Allegheny county, to Middlesex, in Butler county, Pa. M. W. Everson, Pittsburgh; N. A. Sutton, Steubenville, Ohio; Alwine M. Oliver, Sewickley, Pa.

Smithton Electric Company, Pittsburgh; $5,000; supplying light, heat and power. H. S. Thatcher, 101 Hutchinson avenue, Edgewood Park; F. W. Riffner, 216 Tenth street, Sharpsburg, Pa.; H. A. Wieland, 411 Dawson avenue, Bellevue, Pa.

Hovis Water Relife Packer Company Franklin, Pa.; $10,000; manufacturing and sale of oil well supplies, packers for oil, gas and water wells. J. J. Van Dressner, A. J. Sibley, R. G. Hancox, T. J. Richards, all of Franklin, Pa.

Oil City Grease Company, Oil City, Pa.; dealing in petroleum, animal and vegetable oils and their products. S. W. Nayer, Rouseville, Pa.; R. A. Browns, Oil City; William Edwards, Jr., Oil City; K. G. Taylor, Oil City.

Stewart Coal Company, Knoxdale, Pa., mining, buying and selling all kinds of coal, etc. W. S. Reed, W. B. Warren, I. N. Stewart, John H. Crawford, Knoxdale, Pa.

Lycoming Consolidated Gas Company, Muncy, Pa.; $5,000; manufacturing gas and supplying same. W. S. Bomberger, Grant Beck, Charles Eckinger, all of Harrisburg, Pa.

Watsontown Gas Light Company, Sunbury, Pa.; $5,000; manufacturing gas for light to the public, etc. George W. Beck, Sunbury, George Parkman, Philadelphia; J. Fred Schaffer, Sunbury.

Dreuding Brother Company, Philadelphia, capital increased from $70,000 to $100,000. Arthur D. Barns, secretary.

Pittsburgh-Punxsutawney Coal Company, capital increased from $10,000 to $25,000. W. L. Beatty, secretary.

Diamond Slate Company, Pen Argal, Pa., indebtedness increased from $4,000 to $15,000. William A. Doney, secretary.

James S. Mason Company, Philadelphia, mortgage indebtedness increased from none to $40,000. H. B. Voorhees, secretary.

H. G. Preston Company, New Castle, Pa., capital increased from $25,000 to $100,000. Homer L. Griffith, secretary.

Potter-McCune Company, McKeesport, Pa., capital increased from $100,000 to $150,000. A. C. McCune, secretary.

Mount Gretna Brownstone Company Lebanon, Pa., capital increased from $50,000 to $430,000. H. C. Beury, secretary.

Duncan & Duncan, Incorporated Philadelphia, capital increased from $15,000 to $35,000. Harry W. Maurer, secretary.

Fort Pitt Powder Company, Kittanning, Pa., capital increased from $100,000 to $200,000. H. G. Gates, secretary.

Consumers Light Company, Wilkes-

Barre, Pa., indebtedness increased from nothing to $100,000. T. J. Connelly, secretary.

Wells Creek Supply Company, Myersdale, Pa., capital increased from $5,000 to $10,000. W. T. Hoblitzell, secretary.

Wyoming Chemical Company, Pittston, Pa., capital increased from $50,000 to $60,000. C. M. Hileman, secretary.

Pennsylvania Black Filler & Paint Company, Williamsport, Pa., capital increased from $10,000 to $15,000. E. R. Feerer, secretary.

Herman Pneumatic Machine Company, Pittsburgh, indebtedness increased from nothing to $23,000. J. H. Bialas secretary.

Summerill Tubing Company, Bridgeport, Pa., capital increased from $30,000 to $50,000. E. V. Gabel, secretary.

Manatawney Bessemer Ore Company, Philadelphia, capital increased from $5,000,000 to $7,000,000. Stephen Robinson, Jr., secretary.

McHenry - Millhouse Manufacturing Company, manufacturing and sale of felt roofing, etc. Laws of Indiana. Principal office, South Bend, Ind.; Pennsylvania office, Farmers Bank building, Pittsburgh.

Ludlow Valve Manufacturing Company, manufacturer of valves, etc. Laws of New Jersey. Principal office, Troy, N. V.; Pennsylvania office, Farmers Bank building, Pittsburgh.

Ohio.

A. S. Boyle Company, Cincinnati, manufacturing and selling floor waxes and polishes, varnish removers and other kindred products at wholesale and retail; $100,000. F. Fred Fromeyer, Joseph Rosensteil, Leonard G. Meyer, Alfred S. Boyle, Edward P. Moulinier.

Doylestown Aluminum Ware Company, Doylestown; manufacturing and dealing in aluminum and metal table and kitchen ware, novelties, agricultural and household implements; $10,000. Harvey J. Heller, J. B. Meech, Peter B. Strobel, Charles E. Lozier, George G. Lozier.

Nickel-Plate Elevator Company, Cleveland; grain and kindred products; $80,000. F. C. Friend, Charles Kovanda, A. M. Freund, J. G. Reyant, L. D. Greenfield.

Yankee Combination Nozzle Company, Cleveland; combination nozzles, brass goods and novelties; $10,000. W. M. Towle, Jr., Wilkin Towle, James H. McConkey, Francis J. French, Harold Whitney.

Singleton-Ruffner Company, Cincinnati, asphalt, composition, gravel roofing and kindred products; $5,000. E. R. Humphries, Sarah E. Humphries, W. C. Webb, Pearl Webb, R. H. Young.

The Electric Magnetic Appliance Company, Cleveland, electrical machinery; $100,000. Robert Williams, M. Goodhue, S. H. Blakeslee, J. A. Curtis.

South Ashland Gas & Fuel Company, Ashland, oil and gas; $10,000. George Vantilburg, J. W. Lemon, Frank Zehner, L. M. Melbert, S. F. Mohn.

South Dayton Railroad Company, Dayton; for the purpose of acquiring, constructing, maintaining and operating a railroad as well as extending the same, the termini of which shall be what is known as "South Dayton," on the C.,

Wanted, For Sale, Bargains.

Want and For Sale advertisements published in these columns, one cent a word. No advertisement taken less than 25 cents.

WANTED

WANTED— 1 yard crane, about 75-foot span, 220 volt, 10 ton lift, with about 300 feet of runway. Address Industrial World, Box 108A, 108 Smithfield St., Pittsburgh, Pa.

WANTED New or second hand equipment as follows:
One 12" or 14" engine lathe, with 12-foot bed, for automobile work and general use.
One 16" or 18" engine lathe, for heavy work, to take automobile axles.
One 20" upright drill complete.
One radial drill, for use on frame work, largest hole to be bored, estimated at 1¼".
One 25 H. P. twin cylinder gas engine.
One 2½ kw. generator.
One electric drill (hand work).
One 16" or 18" lathe, 8-foot bed, to take about 5 feet between centers. Combination rest; power cross feed; back geared and hollow spindle.
One 22" or 24" drill press.
One 20" drill press, both hand and power feed.
One 21"x36" slide valve engine (left hand).
One 20"x36" Corliss engine (left hand).
One 100 H. P. Cornish Water heater (open type).
Address H, care Industrial World, Pittsburgh, Pa.

WANTED—Bright, energetic young man, to act as assistant to manager of a malleable iron plant. Must be a good correspondent and familiar with costs in this business. Address Box A, the Industrial World, 108 Smithfield street, Pittsburgh, Pa.

WANTED—Works manager, with mechanical knowledge for plant employing three hundred men. Must be good organizer, forceful, and be able to initiate improvements. Foundry, machine, forge, plate and structural shops embraced in plant. Manitoba Bridge & Iron Works, Limited, Winnipeg, Canada.

WANTED—Chief draftsman acquainted with crane and hoist construction. One who can give positive evidence of ability can secure permanent and satisfactory position. Address Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

WANTED — A man who understands the manufacture of high grade parting. Address F. C. Adams, 702 West Division street, Chicago.

WANTED — Experienced Salesman to sell pumps to the hardware trade of the Southwest; an opportunity to the man of ability to make a handsome salary. None but salesmen need apply. Address The E. Z. Force Pump Company, Winston Salem, N. C.

WANTED — A good live Salesman to represent Eastern concern manufacturing screw machine product. Address P. O. Box 1455, Springfield, Mass.

WANTED — Inquiries to purchase or sell iron, steel, metals, machinery, contractors' equipment, iron buildings, and bridges. Address Thomas J. Pope, 59 Beekman street, New York.

WANTED—First-class man to take charge of annealing room. Must be able to handle men and produce results. Give references and salary expected. Address Box 94, Syracuse, N. Y.

Want and For Sale advertisements published in these columns, one cent a word. No advertisement taken less than 25 cents.

ASSISTANTS WANTED

WANTED Assistant Purchasing Agent who has had experience in the iron and steel business. State experience, where last employed and salary expected. Address Box C., care Industrial World, Pittsburgh, Pa.

WANTED—Assistant Superintendent of Machine Department. One who has had experience in the building of engines and rolling mill machinery. State experience, where last employed and salary expected. Address Box D., care Industrial World, Pittsburgh, Pa.

WANTED — Salesman for Cement Coated Wire Nails. Must have had experience. Give reference, name and salary. All communications strictly confidential. American Steel Company, Park Building, Pittsburgh, Pa.

POSITIONS WANTED

WANTED—Clean-cut Young Man, 24 years old, of good habits, appearance and address, exceptional ability and ambition, desires to connect with a first-class concern as an all-around man, for either inside or outside work. Opportunity desired more than salary at present. Has technical and clerical experience as a draftsman and estimator, also spent some time in sales department as correspondence clerk and sales duties, with reputable concerns; excellent references. Address B, care Industrial World, Pittsburgh, Pa.

WANTED — Ambitious and Capable young married man wants position with good live, substantial company, manufacturing iron, steel, machinery or allied trades, where there is good opportunity for advancement in either Sales or Executive Departments. Willing to work in shops if necessary, to gain essential knowledge. Address Box 222, Oakmont, Pa.

FOR SALE

FOR SALE—240 acres of pink dolomite limestone, along the Baltimore & Ohio Railroad. For further information, call or write to G. W. Engle, Charles-Town, Jefferson county, W. Va.

SALE BY TENDER.

Tenders will be received by the undersigned until November 1, 1911, for the purchase of Land, Buildings, Plant, Machinery, Tools, Dies, Stock in Trade and Good Will of the Rapid Tool Company, Limited, insolvent, of Peterborough, Ont., formerly carrying on business as manufacturers of Auger-Bits, etc. Full particulars may be had upon application. W. R. Morris, Assignee, 375 Water street, Peterborough, Ont., Canada.

FOR SALE—The drawings and patterns of a line of metal working machinery, sufficient to equip completely, Steel Plants, Rolling Mills, Tube Mills, Spring Works, Bridge Works, Boiler Shops, and Plate-Glass Plants. The engineering and selling talent also is available. Address Engineer, care the Industrial World, 108 Smithfield street, Pittsburgh, Pa.

HYDRAULIC WHEEL PRESSES
29 Sizes. Capacities 50 to 400 tons
AIR COOLED AIR COMPRESSORS
6 Sizes. Capacities 4 cubic feet to 25 cubic feet.
Write for catalogues and prices.
E. R. CALDWELL & CO., Bradford, Pa.

C., C. & St. L. Railway Company, a short distance south of the corporation limits of Dayton, Ohio, thence in a northerly direction to said city. Also, the right to extend the same within the limits of Montgomery county, Ohio, by branches or otherwise; $15,000. Abner Rhoads, Charles Rhoads, R. E. Evans, George W. Ozias, Joseph M. Weigand.

Parish & Bingham Company, Cleveland, cold pressed steel, metal stampings, dies, tools, metal supplies of all kinds; $1,000. Agnes D. Morse, William Cairns, W. D. Gemmill, F. W. Vilmar, F. W. Asmus.

Hamlin Oil Company, Pleasantville, drilling for oil and gas; $10,000. L. E. Keller, Elmer Hupp, W. D. Whitting, Christian Weaver, R. E. Wildermuth.

Hammer & Hull Company, Cleveland, automobile supplies; $10,000. J. Bushea, J. Miller, C. Murman, W. J. Mahon, M. A. Hammer.

Auto Specialty Company, Toledo, automobile parts and accessories; $10,000. Charles S. Northup, Lewis W. Morgan, Louise Letcher, Earle Peters, Charles H. Masters.

E. A. Hammer Company, Cleveland, automobile, motor boat and other accessories; $15,000. J. Bushea, J. Miller, C. Murman, W. J. Mahon, E. A. Hammer.

Star Vulcanizer Manufacturing Company, Columbus; manufacturing vulcanizers and other automobile sundries. David F. Detrick, W. L. Fox, Nelson J. Fountain, Elizabeth Cox and Alice Fountain.

W. M. Bollenbacher Hardware Company, Bellevue; hardware, plumbing and tinning; W. M. Bollenbacher, Charles F. Yarger, Daniel W. Biebricher, Elmer Meacham and M. D. Hickey.

Reuscher Manufacturing Company, Toledo; pipe threading machinery. David C. Walters, Charles C. Kester, John V. Newton, Frank M. Schramm and Charles J. Reuscher.

Cleveland Brick Sales Company, Cleveland; burnt clay products. P. B. Belden, R. W. Hartung, R. W. Umbenhour, George W. Belden and H. S. Belden, Jr.

Theobald-Munford Paint & Glass Company, Cincinnati, change of name to the Theobald-Munford Company.

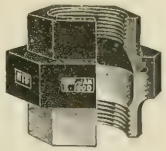
Sharp Spark Plug Company, of Cleveland; increase of capital from $10,000 to $20,000. J. F. Johnson, president; F. D. Johnson, secretary.

B. S. Sprague Electrical Company, of Marietta; manufacture and sale of electrical, gas and blasting materials, dealing in electrical fixtures and appliances; $10,000. Harry T. Sprague, Perl O. Sprague, Allen T. Williamson, S. A. Millikan and Elva Martin.

Algonquin Light, Heat & Power Company, Dayton; furnishing heat, light and power; $10,000; 100 shares of $100 each. Fanny H. Peirce, J. Elliot Peirce, Mary Frances Peirce, Virginia Peirce Wood and Lee Warren James.

Northfield Oil & Gas Company, of Northfield; procure mine, own, deal in, transport and store crude oil petroleum and all of its by-products and natural gas; $20,000; 2,000 shares of $10 each; John B. Chapman, William M. Southern, P. L. Stanford, Norah S. Good and Richard Mauser.

Hess Spring & Axle Company, Car-



"The Union with no inserted parts"

THE SPECIAL PURPOSE OF A UNION

will be discussed in next week's issue, and should be of interest to every user of unions. Don't miss page xvii.

NATIONAL TUBE COMPANY,

PITTSBURGH, PA.

KNOX PRESSED and WELDED

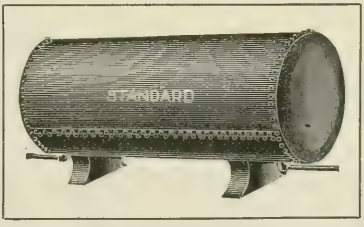
. . . STEEL COMPANY . . .

MANUFACTURERS OF ALL CLASSES OF

STEEL PLATE CONSTRUCTION - WELDED STEEL SPECIALTIES

OFFICE: FARMERS BANK BUILDING, PITTSBURGH, PA. WORKS: NILES, OHIO.

Sole manufacturers of Knox Patented Water Cooled Parts, Doors and Door Frames for Open Hearth Furnaces.



Standard Tanks for any purpose: Water, Air, Oil, Gas. We guarantee every tank absolutely tight and all openings plugged for shipment, keeping the tank clean and the tappings free from injury.

We are manufacturers of all kind of Plate Construction, Stand Pipes, Self Supporting Stacks, Accumulators and Air Receivers; also Freezing Tanks and Drip Pans for ice plants.

Write for price lists on Pneumatic Steel Tanks, Air Receivers and Oil Storage Tanks, which we carry in stock ready for immediate shipment. We can also quote you attractive prices on your special requirements.

STANDARD STEEL TANK & MFG. COMPANY

Works: Girard, O. PITTSBURGH, PA.

NEW YORK PITTSBURGH CHICAGO

OTIS ELEVATOR COMPANY

ELECTRIC AND STEAM

AUTOMATIC

Hoisting and Reversing Engines

NEW AND REFITTED. Full Description on Reques

SAMUEL TRETHEWEY & CO., Ltd.

ROTARY, STRAIGHT and ANGLE SOLID STEEL SHEAR KNIVES

Roll-Turning Tools,
Roll-Turning Plugs,
Special Blanking Dies

47th St., Pittsburgh, Pa.

Hess, reduction of capital from $500,000 to $100,000. E. J. Hess, president, and C. G. Stembacker, secretary.

Reed Manufacturing Company, Springfield, Ohio; increase of capital from $50,000 to $100,000. George L. Reed, president; F. C. Reed, secretary.

The Realty Construction Company; changing name to the O. W. Kirchenbauer Company, Toledo, Ohio. O. W. Kirchenbauer, president, and C. A. Kirchenbauer, secretary.

Indiana.

Shreveport Glass & Bottle Company, Indianapolis, manufacturers, $150,000; to establish plants at Shreveport, La., and elsewhere. Harry Wagner, Arthur Call and Thomas Murray.

Simplex Railway Appliance Company, Delaware; $1,000,000; certified in Indiana for full amount of stock; to manufacture railway devices. Indiana Office, Hammond; H. H. Phillips, president.

Imperial Coal Company, Elkhart; notice of dissolution.

Hamilton Coal Company, of Cincinnati, notice of dissolution.

Primm Oil Engine Company, Hartford City, notice of dissolution.

Indiana Coal & Clay Company, Greencastle; producers; $50,000. G. W. Bence, J. W. Stoner, G. W. Hanna, Jonathan Houck, J. E. Houck, D. F. Reid and Ora Tustison.

Ziegler-Huff Lumber & Coal Company, South Bend; dealers; $70,000. G. W. Zeigler, O. G. Huff, D. W. Place, C. R. Huff and C. F. Strickler.

The National Irrigation Water, Elevator & Power Company, Gary; to manufacture irrigation machinery; $50,000. Asistidis Valchis, Cort Valchis, Harry Awan and George Tamparys.

Illinois.

Walther Construction Company, Chicago; $5,000; general building contractors. Frederick W. Walther, Harry W. Keutemeyer and Samuel J. Lumbard.

Beck Coal & Lumber Company, Chicago; capital increased from $35,000 to $75,000.

W. S. Edwards Manufacturing Company, Chicago; name changed to Ummach Manufacturing Company.

National Stone Company, Chicago; dissolved.

Chicago Contractors' Supply Company, Chicago; name changed to National Stone Company.

Missouri.

Automobile Combination Lock & Circuit Breaker Company, of Kansas City; $25,000. Smith Baker, S. R. Hilt, J. W. Nowlin and others.

Mexico Power Company, Mexico; $300,000. S. M. Locke, E. K. Locke, P. F. Locke.

Fredericktown (Inc.) Light & Power Company, Fredericktown, $15,000. Earl Gates, A. J. Boardmen, R. G. Stevenson.

Sterling Coal Mining Company; $60,000. S. A. Meddaugh, H. Brown, A. B. [illegible].

Mid-West Construction Company, of Kansas City; $10,000. H. C. Shimp, James A. Jackson, D. W. Morton.

Mariposa Mining Company, of Kansas City, $10,000. F. H. Farrar, J. D. Forrester, E. A. Swain and others.

Miller Sandy Machinery Company, of Kansas City; $10,000. M. E. Miller, Seth S. Sandy, James H. McVay.

William Jessups & Sons, Incorporated, of New York, dealers in iron, steel, etc., with a home capital of $200,000 licensed to do business in St. Louis on $27,000.

Keck Builders' Supply Company of St. Louis, capital increased from $25,000 to $35,000.

Fidelity Construction Company, of Kansas City, $100,000. John W. Hoffman, C. G. Brooks, C. Hoffman.

St. Louis Surfacer & Paint Company, capital increased from $50,000 to $75,000.

Delaware.

Chester Manufacturing Company, Wil

Highest Grades Phosphor Bronze, Monel Metal and German Silver
IN RODS, SHEETS AND WIRE
Manufactured by SHIMER, McGLYNN & CO., Inc.
In their new and up-to-date mill. Correspondence solicited.
SHIMER & CO., Inc., Selling Agents, Bullitt Building, PHILADELPHIA, PA.
Pittsburgh Office: OLIVER BUILDING.

ALEX. LAUGHLIN & CO.,
Engineers & Contractors,
PITTSBURGH, PA.
Builders of Every Description of
FURNACES AND GAS PRODUCERS
—FOR—
IRON AND STEEL WORKS.

C. O. BARTLETT AND SNOW CO.
MAKERS OF CLEVELAND, O. U. S. A.
PICKING TABLES
ELEVATORS AND CONVEYORS.

LOCOMOTIVE CRANES
Railway Wrecking Cranes and Pile Drivers, Freight Station Transfer and Pillar Cranes, Transfer Tables.
INDUSTRIAL WORKS,
BAY CITY, :: MICHIGAN.
New York Office—50 Church Street.
George M. Newhall Engineering Company Philadelphia.
J. G. Miller, St. Louis, Mo.
P. H. Hopkins & Company, Montreal, Que.

Photograph showing Cutler-Hammer 43 inch Lifting Magnet at Wisconsin Iron Co., Mayville, Wis. This Magnet is operated all seasons of the year in all kinds of weather.

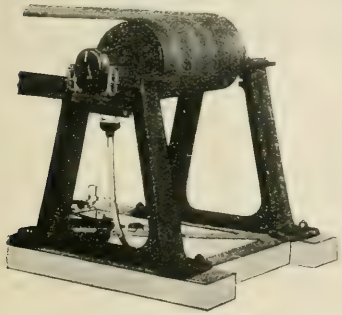
Cutler-Hammer Lifting Magnets Work in Rain, Sleet and Snow. The Only Magnet Ever Used for Submarine Salvaging

Magnets so rugged and water proof as to be able to fish up a boat load of kegged nails and wire fencing from the bottom of the Mississippi River can withstand any kind of weather or hard usage. And they have—"For over two years not a single complaint has been registered against the 'Mississippi' type Magnet."

A Cutler-Hammer Magnet (which does the work of a score of laborers, quicker and cheaper) can be worked in all kinds of weather,—weather which handicaps or prevents laborers from working. The operator is sheltered in the crane cab.

For use with locomotive cranes our 43-inch magnet (shown in illustration) is recommended. Our 36-inch magnet is especially suitable for skull-cracker work. Plants handling large quantities of pig iron and scrap daily, usually prefer the 52-inch size. We also make special magnets for handling plates, tubes, rails, etc.

Cutler-Hammer Magnets will increase your profits by decreasing the cost of handling your raw material. We will be glad to send you names of concerns that have found this out. Their repeat orders are proof.



MAGNETIC SEPARATORS

for the Mine and Fuel Company, Cement Mill, Foundry, Machine Shop, Paper Pulp Mill, Sewage Disposal Plant, Fertilizer Plant, Etc.

Magnetic Separators prevent costly injuries to ore, coal and rock crushers and similar machines.. They separate magnetic material from non-magnetic material.

Let us give you complete information about these magnetic separator pulleys and tell you where 25 of them have been installed during the past four or five months.

Drop us a line to-day.

Some Recent Installations

New Staunton Fuel Co.
H. S. Chalfant Paper Co.
Wilson Mining Co.
American Gypsum Co.
Farmers Fertilizer Co.
Sewage Disposal Plant, City of New York.
Newark Lime & Cement Co.
Standard Sand & Machine Co.
Jeffrey Mfg. Co.
Burgess Sulphite Fiber Co.
Berwind Fuel Co.

The Cutler-Hammer Clutch Co.

MILWAUKEE

NEW YORK, Hudson Terminal
CHICAGO, Peoples Gas Bldg.
BOSTON, 176 Federal St.
PHILADELPHIA, 1201 Chestnut
PITTSBURGH, Farmers Bank Bldg.
CLEVELAND, Schofield Bldg.

PACIFIC COAST AGENTS: Otis & Squires, 579 Howard St., San Francisco.
229 Sherlock Bldg., Portland, Ore.; W. B. Palmer, 416 East 3rd St., Los Angeles.

...n, Del., $100,000. Robert F. Plum, ... R. Sa G. Plum, both of Philadelphia; M. Clayton Stevenson; Robert E. Wallace, William C. Kelley, Chester, Pa.

Columbia County Coal Company, Claymont, Del.; $1,000,000. Wilbur F. Miles; T. Frank Taylor and George Hauck, Philadelphia, and F. B. MacCarthy, Claymont, Delaware.

Gordon Coal Company, Wilmington, Del.; $1,000,000. George L. Baker, M. B. Hughes and J. G. Gray, Philadelphia.

New York.

Inman Manufacturing Company, Inc., Amsterdam, N. Y.; manufacturing box machinery, etc.; $300,000. Horace Inman; Charles H. Inman, and Ralph A. Wood, all of Amsterdam, N. Y.

Bland Adjustable Display Fixture Company, Schenectady, N. Y.; manufacturing adjustable display card holders, devices, etc.; $10,000. Louis Bland; Philip G. Hodwitz and Morris Slater, all of Schenectady, N. Y.

Atlas Still Manufacturing Company, Manhattan; manufacturing stills, condensers, boilers, etc., manufacturure and deal in distilling and condensation apparatus; $300,000. Max M. Kotzen, 237 West One Hundredth street; Jacob Lichtenstein, 995 Union avenue, Bronx; Ralph H. Raphael, 520 W. 122 street, New York city.

Thorp Iron Company, Manhattan; manufacture and deal in structural iron work, etc.; $30,000. Adolphe H. Fiserh, 129 W. Seventieth street, Ne wYork city; Charles H. Parsons, 236 Washington avenue, Brooklyn; Winfield S. Thorp, 6 Morningside avenue.

Phelps Dodge Mercantile Company, Manhattan; deal in lumber, etc., general merchandise; $4,000,000. George Notman, 99 John street, New York city; William F. Crane, Montclair, N. J.; Frederick T. Bulmer, Madison, N. J.

American Iron Supply Company, Bronx; in iron and steel materials; $10,000. Frank Welden, 359 East One Hundred and Fortieth street; Sam M. Waldstein, 328 Beekman avenue; Archibald H. Murdock, 322 E. One Hundred and Forty-second street, New York city.

The American Overhead Electrified Irrigation Company, Manhattan; manufacture patented apparatus, etc.; $200,000. George W. Yepsen, George Weaver, 20 Broad street; Lewis Allport, 18 East Seventeenth street, New York City.

F. X. Muller Hose Coupler Company, Buffalo, manufacturing hose couplers, metal articles, etc.; $100,000. Frank X. Muller, 26 Lyth avenue; Joseph Bronold, 1335 Jeff street; Crescentia Hurley, 70 Landon street, Buffalo.

Commercial Specialties Company, Manhattan; deal in office specialties, etc.; $10,000. Earl W. Iles, James P. Callender, Charles H. Blauvelt, 32 Broadway, New York city.

Blanchard Lumber Company, Buffalo; manufacture lumber, etc.; $75,000. Thomas H. Blanchard, 224 Laurel street; Nellie A. Barrow, 28 Coe Place; Carlton E. Ladd, 159 Highland avenue, Buffalo.

Benjamin Haas.

Benjamin Haas, long identified with the iron and steel business of Pittsburgh, is dead at his home, 335 S. Atlantic Ave., Pittsburgh. He had been in ill

UNITED STATES
Cast Iron Pipe & Foundry Company.
OPERATING 11 PLANTS.
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health for more than a year. Mr. Haas came to Pittsburgh from Cincinnati 11 years ago to take the district managership of the Joseph Joseph Brothers' Iron & Steel Company of Cincinnati. He remained in that capacity until two years ago, when he engaged in business for himself.

COMMERCIAL ROUTES VIA PANAMA CANAL.

The Hansa, the organ of the Hamburg shipowners, after consideration of the probable effect of the opening of the Panama Canal upon steamship routes, states that after the month of June, 1913, should the canal be opened to navigation at that time, steamers proceeding from Europe to San Francisco will no longer go via Cape Horn, a route of 13,621 sea miles, but will save 6,200 sea miles via the canal route. Steamers proceeding from Montreal to Sydney now cover 13,690 sea miles, but in the future will be able to do so over a route of 10,952 sea miles.

It is difficult to predict the effect of the canal upon freight traffic between Europe and Valparaiso, the Cape Horn route being only 2,100 miles longer than the canal route. Passenger ships probably will pass through the canal, serving the east coast of South America by means of auxiliary ships sailing from West Indian ports.

Routes to the Far East.

Trade between Europe and Japan will not be influenced by the canal, as the Panama route will be 1,000 miles longer than the one now followed. From New York to Shanghai, on the other hand, the difference in favor of the canal will be 1,400 sea miles. The present route from Europe to Australia is 800 miles longer than the route via the canal, which is scarcely enough to threaten any great change. It is assumed that a part of the business from New Zealand to Europe, which to-day comes via Cape Horn, will pass through the canal hereafter, saving 1,600 sea miles. The canal route will be selected also by passengers who wish to avoid the rough and stormy rounding of Cape Horn. The chief part of the steadily increasing business between New York and Australia and New Zealand should therefore proceed via the canal rather than by the Cape of Good Hope, saving 2,300 sea miles.

The probable changes in navigation routes will create equally great changes in the distribution of the coal trade, for which English firms have made preparation already. It is stated that English firms are now making arrangements to open coaling stations at Nukulofa, the capital of the Friendly Islands, and upon Pitcairn Island.

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ISOLATED PLANTS VS. CENTRAL STATIONS.*

Rossiter Holbrook.

UNDER the general subject of Isolated Plants vs. Central Stations, I will divide my talk into four headings:

1—The illegitimate business of the central stations

2—The comparative horsepower of central stations and isolated plants.

3—Is the isolated plant a paying investment? and

4—Gas engines for isolated plants.

Before taking up the first subject in any way, I wish to emphasize the fact that I absolutely believe, and I think most all of us present believe that the central stations are a necessity. They have their field and should have the support of the community so long as they conscientiously try to please that field. But, when they begin to step outside the field in which they belong, I hope I may be one of the first to bring them to time.

We are now having a very serious discussion in New York before the Public Service Commission, regarding the discrimination in rates which we claim is being practiced by the New York Edison Company. I will not go into this matter in detail, but suffice it to say that they are selling current with a variation in rates of from 1½ to 10 cents per kilowatt hour, which discrimination is absolutely unfair in every sense of the word, especially when it is shown from their own reports to the Public Service Commission that they cannot manufacture and deliver current for less than 3¼ cents and make money.

New York Conditions.

What I do want to take up are the reasons why the central station cannot legitimately compete with the isolated plant.

Not being a resident of Cleveland and not having any public service reports for this city, I am going to take New York as an example and discuss the New York Edison Company's report to the Public Service Commission for half year ending December, 1909. (I take this year because Mr. Moses, with whom I am associated, has figured this out and the reports since then have had practically the same percentage).

The total income for the six months was $7,231,602.62. The cost of producing this at the switchboard was $1,318,570.21, which is about one-sixth of the selling cost. The other five-sixths are made up of—

Distribution	$1,210,108.84
General expenses	704,400.71
Amortization	916,024.11
Uncollectable bills	92,860.08
Taxes	402,943.21
	$3,325,336.95
Dividends	$2,586,695.46

Think for a moment. One-sixth of the cost to the consumer is the actual cost of manufacture.

Another point. Less than $917,000 is set aside for amortization. They actually wish to make the isolated plant owner figure 10 or 15 per cent for this, and then they figure 1 per cent semi-annually.

Still another point

There were 120,000,000 kw. hours delivered during these six months, which required over 697,000,000 pounds of coal or over 5½ pounds of coal per kw. hour delivered, yet the smallest gas engine producer plant uses less than 2½ pounds of coal per kw. hour.

I shall not continue these details far-

* Extract from an address read before National Gas Engine Association, Cleveland, December 6, 1911.

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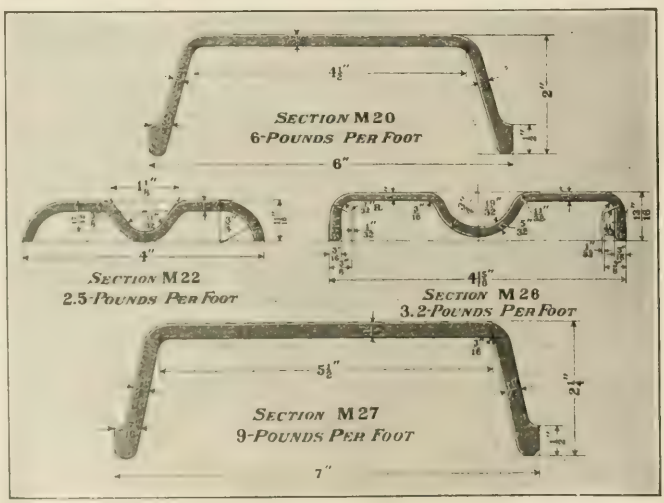

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ther than to say that their labor cost was greater than a private plant's; their waste losses over seven times as great; their repair and maintenance expenses far greater. And yet they are trying to compete.

In order to do this they soak the little fellow so as to pay the losses they have incurred by selling to the big fellow, at less than the cost of manufacture and distribution. In doing this they are still more unfair because their discrimination is entirely based on quantitative use and not on the hours of service.

All of this goes to show how the central station is not fitted to compete with the isolated plants and central stations.

A friend once said to me, in all sincerity, "You know as well as I do that isolated plants are a thing of the past." I naturally felt a little touchy, but had no proof. A little while after this a member of one of the largest companies supplying the central stations with lamps, fans, and in fact all their necessities, asked us (I speak of Mr. Moses and myself collectively, as we are trying to be editors), "Have you any figures to show the comparative horsepower of central stations and isolated plants in the United States?" We had to say no, but we have started to collect this data. We have covered Connecticut, Delaware, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Wisconsin and Illinois—fifteen states in all, less than one-third the total number in the Union. In those fifteen states there are 5,544,888 engine horsepower in isolated plants, and in the whole United States the total central station horsepower is (according to the census bureau) 4,862,921.

Why in this one state of Ohio there is a good deal over 800,000 horsepower of isolated plants, and Cleveland has well over 390,000 horsepower of them.

Gentlemen, a small but interesting detail that has been brought to my attention is that of the ninety-two hotels in New York City, with 200 or more rooms, only four are without a private power plant. I am bringing all this data up that I may ask: "Are these owners of isolated plants out of their heads?" To hear a central station man talk, one might think so.

I wish I had time to name over to you the hundreds of small and large office buildings, loft buildings, stores, etc., all having their own power plants; and the owners are enthusiastic advocates. You don't hear about those who are pleased but the central stations are very careful to see that you learn about the few that are displeased.

Incidents in Chicago.

And now we come to the question: "Is

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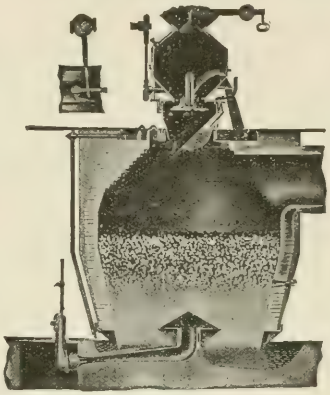

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an isolated plant a paying proposition?" The central stations say they are not. I should very much like to know why the Commonwealth Edison Company is operating the plant in the Majestic theater building, on Monroe street, Chicago, Ill. They bought this plant at a rather fancy figure, and if they had believed in their own talk it would have been "junked"; but not so, for they are operating it. The same condition exists at Gunther's, the Fisher building, and the Chicago Title & Trust building. In all these cases the landlord and tenants are getting bills from the Edison Company, who in turn is operating the landlords' own plant and making money on it. Why, gentlemen, the New York Edison Company has installed a little isolated plant at its own coal yards, instead of using current from its mains. If the central station will do these things—well, I will leave the rest to your good sense. I could stand here all night and describe isolated plants that I know about, and give the accounts, operating costs, including rent, interests, depreciation, and all the other tommy-rot charges the central station wishes to put on, and find the cost of current was well below the cost from the central station. I have reports from all over the country, such as the Great Northern of Chicago, where the total operating expense for 1905 was over $64,000 as against less than $34,000 for 1907, when a plant was in operation, a saving of 48½ per cent; the Missouri Baptist Sanitarium of St. Louis, that saves $1,000 a year out of a total operating expense of less than $5,000; the Sohmer building (an office building) of New York, 29x100, twelve stories, with a yearly cost of $2,761.25 for heat, light and power, including 120,000 kw. hours of electricity delivered from the plant. What would the Cleveland central station charge for the electricity alone? The Langsdorf building, a loft-building where the total operating cost for 1910 for light, heat and power, amounted to $7,757.39, and the electric current alone from the Edison company would cost $8,198.85, making a saving of $441. And I have here a report made by Mailloux & Knox on the plant in R. H. Macy & Company's store, installed in 1902. I should be glad to show anyone this report. They have covered seven years—1903 to 1910—and the cost of electricity is 1.52 cents per kw. hour. I could continue indefinitely to show you plants that are making anywhere from 20 to 30 per cent profit on their investment.

Gas Engines and Producer Gas.

This brings us to the subject of gas engines and isolated plants. First, we will show how the talk about reliability is perfectly ridiculous. The central stations say they are unreliable. If so, why do they use them? There are over 60,000 horsepower of gas engines in central sections in the United States. Incidentally, there are 172 central station gas producer plants in New England. Think of the unreliable central stations there must be. The big San Francisco central stations are putting them in. "But," says your central station man, "these are big units and are, therefore, reliable." This is some more of the fallacious reasoning. These gas engine central stations are more in the small units than the large, and they run all the way from 40 horsepower up. A typical example of a gas engine installation for central station work is right out here in the Hoopeston Gas & Electric Company, Hoopeston, Ill. Here is a single unit central station plant, a 280 horsepower engine and two producers of 150 horsepower each. Just think of it! They have been supplying a community and have no breakdown. How they would hold up their hands in horror if an isolated plant attempted to run without a reserve unit. Then there is the Everton Electric Light & Power Company out in Deer River, Minnesota, with another single unit gas engine producer plant of 80 horsepower.

Before taking up the natural gas side of the question, I am going to tell about a few of the producer gas plants that I have seen, and carefully watched the operation of for days at a time.

My first visit was at the small weaving mill of C. E. Hertlein, in New York City. The plant consisted of one 120 horsepower, two-cylinder horizontal, single-acting engine (which was doing all the work), and one two-cylinder vertical, single-acting engine of 120 horsepower, which was held in reserve. Furnishing fuel for these were two producers of 125 horsepower and 150 horsepower, respectively. I have a more detailed account of this plant, but time will not allow me to go further than to say that after taking a day's time in figuring every possible expense against the plant, I found it was operating for less than 1.35 cents per kw. hour.

There is another little incident in connection with this plant that I want to speak of: Located in a dark corner of the cellar is a little 10 horsepower gas engine, running on city gas, which drives line shafting for the machine room. The engineer said that the engine had been purchased by them second-hand fifteen years ago and had been in continuous ten hours a day operation ever since. It is still operating with the old type flame ignition and developing nine and one-half horsepower.

Another plant, that of Messrs. Stroebel & Crane, in Newark, N. J., a loft building, four stories high, 50x100 feet. The plant is a single unit gas engine producer plant, 100 H. P. capacity. It has operated for four and a half years, ten hours a day, with one stop of 20 minutes during operating hours. I should like to go further into the details of this plant, but suffice it to say that charging everything up to the plant, including interest, depreciation and even the heating of the building by steam, the cost kw. hour is less than 2.1 cents.

Then there is the producer plant in the Acme Garage, on Thirty-second street, consisting of two 75 horsepower units, with charges of less than .8 of a cent per kw, including coal, oil, sundries and labor. Also the Perika Chocolate Company, in Brooklyn, with a 40 horsepower single unit producer plant, and operating cost, exclusive of fixed charges, amounting to the large sum of less than .6 of one per cent per kw. hour. * * *

Availability of Natural Gas.

Now, in regard to the natural gas, it seems a marvelous thing to me to realize that fuel for an engine, all prepared and ready for use, can be purchased at nearly as low a price as the gas from a gas producer plant. Think of it! You are paying 30 cents for 1,000,000 heat units, and the fuel necessary to produce 1,000,000 heat units in a producer with coal at $3.75 to $4 a ton figures between 21 cents and 24 cents. On top of this you have the cost of the producer, interest on same, labor on same, standby losses, space taken up, and many other inconveniences, besides probably not getting as even a quality of gas. Why, I should think that a building of any size at all would, under no conditions be without its own plant. Do you know that there is a small department store in New York City at the present time where they have decided to put in a producer plant under the most difficult conditions, namely, placing the producer under the sidewalk, and when it is necessary to poke it, poke it from the sidewalk. And you have the fuel without all this. Incidentally, this plant is being installed by an operating company on the guarantee of a saving of $5,000 in total operating cost of only $9,000. But here in Cleveland, with no difficulties of this kind to overcome—well, I can't see how the subject can be open for discussion.

Claims for Isolated Plants.

I shall sum up the advantages of isolated plant service:

1—Lower cost per kw. hour—usually less than one-half the best central station.

2—Greater reliability of service, because the plant is located on the premises supplied and the building is not dependent upon power stations located a mile or more away, with lines laid

through streets subject to disturbance and with power house machinery operated under excessively high pressure.

3—Independence. Where an isolated plant is operated the building owner can fix the price at which he will sell current and the hours during which the current will be available; he can regulate the voltage to suit the conditions so that if he uses arc lamps he can run at 110 volts and if he uses other kinds of lamps he can run at 120 volts, as he may see fit.

4—Better maintenance of the building, because of freer use of electricity for lighting and other purposes.

5—Reduced fire risk, because of availability of high pressure power pumps at all times while the plant is operating.

6—Less liability to accidents, because of the presence of mechanics on the premises at all times; also because of more careful inspections and more systematic operation.

7—Increased renting facilities. With an isolated plant a building owner can offer a prospective tenant a low rate for light and power, or he can, if he wishes, include it in the rent without excessive cost to himself, and in this way secure desirable tenants who might otherwise be lost.

8—Electricity available for many purposes. Electricity costing less than 1 cent per additional kw. hour is available for manufacturing, cooking, localized heating and power processes.

Installing Plants as a Business.

Gentlemen, there is money and lots of it in isolated plants. There is a far greater degree of profit than in central stations, for central stations are, and should be, restricted by the public, because they use the public's property, and, besides, they have to supply a very large amount of unprofitable business. The central station is only allowed a certain amount of profit anyway, but the isolated plant's business is unlimited.

At the present time there is an operating company in New York city that is beginning the business of installing plants and operating them for profit.

I can cite you a very interesting case in a large office building on Fifth avenue. This building was running on central station service, but it had high pressure boilers installed. This operating company went to the owners of the building and made the following proposition: "We will form a ——— Power Company and you buy one-half the stock and we the other half. This company will install an electric plant in your basement and pay rent for same. You (the owner of the building) will buy current for just what you would pay the central station company and we will furnish you with heat for what it has cost you in previous years. We will also take on the building next door."

To make a long story short, the profit from the investment for the year just terminated was $10,873 on a total investment of less than $20,000.

There is the kind of company some of you gentlemen ought to form. The object of the company—to install and operate plants for profit.

Now, in regard to the operation of plants: The way to avoid a high labor and repair cost is to have a supervising engineer. Say, there were 15 plants that would all pay $20 a month, that would amount to $300 a month. For this you could hire a good high-class engineer and an assistant. Their duty to be a general supervision of the plants, which would allow of lower priced men in the plants themselves. I should like to go into these matters further with any of those present and show them some records and forms of plants operating under similar circumstances. There are two or three companies in New York city that will take on the operation of plants at a maximum guarantee or kilowatt hour guarantee.

I wish to thank you for your leniency and kind attention and I hope that I have not spoken entirely in vain.

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RECENT PATENTS

The following patents, granted to December 19, are reported expressly for the INDUSTRIAL WORLD, by Siggers & Siggers, patent attorneys, Suite No. 30, National Union building, Washington, D. C.

1,012,310—Frank A. Wilmot, Bridgeport, Conn., improvements in the manufacture of iron and steel. This invention is designed to provide an improved method by which steel may be more cheaply and rapidly produced than heretofore. It consists of smelting iron ore without reference to analysis for silicon content of the pig to produce a low grade pig, treating said pig in a basic regenerative open hearth at a temperature materially below normal steel making temperatures to partially eliminate the metalloids, and then transferring the metal to and treating it in an open hearth furnace to produce steel.

1,012,204—Charles A. Juengst, Crofton Falls, New York, improvements in metal-sawing machine, assigned to Higley Machine Company, Crofton Falls, N. Y. This invention relates to the art of sawing metal in a cold state, and the object of the invention is to simplify the device to make more positive and quick acting the automatically-operating devices which yield for the dis-connection of the feeding devices under excessive load and to readily, quickly and positively vary the speed of the saw through the work. It consists of the combination with the saw carriage, of a power shaft, a second shaft, gears connecting said shafts, a feed screw for said saw carriage, driving connections between one of said shafts and the feed screw for rotating the screw in one direction to advance the saw through the work, and connections between the other of said shafts and said feed screw for rotating the screw in the opposite direction to withdraw the saw from the work, said last-named connections including slip devices frictionally engaging one of said gears.

1,012,091—Wyllis H. Markland, Altoona, Pa., improvements in metal-boring apparatus. This invention was primarily devised, and is peculiarly adapted, for boring out the axle receiving holes in car wheels, although the invention is by no means limited to such specific use. It consists of the combination of a boring bar, means for giving [illegible] carried thereby and sharing in said movement, and means dependent on said movement for automatically shifting the cutters relative to the bar into

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G. W. McCLURE, SON & CO.,
BESSEMER BUILDING (Cable Address Mcclure, Pittsburgh.) PITTSBURGH, PA.

a position, during the movement of the bar in one direction, different from that occupied by them during the preceding movement of the bar in the opposite direction.

1,012,872—David H. Lentz, Chicago, improvements in apparatus for balling scrap metal. The invention has for its object to provide a new set and improved form of apparatus for welding scraps of metal into compact and relatively homogeneous masses or balls. The principal object of the invention is to provide mechanism whereby scrap iron may be fed into the mechanism as scrap and may be so treated by the operation of the mechanism as to unite it into a relatively solid mass of iron. It consists of the combination with a rotary balling chamber provided with a balling hearth, the surface of which is curved both longitudinally and transversely, of a barrel adapted also to be rotated, into which the charge is received and which feeds the same into the welding chamber.

1,012,934—Elihu Thomson, Swampscott, Mass., improvements in electric metal-working apparatus, assigned to Thomson Electric Welding Company, Lynn, Mass. This invention relates to that class of electric metal working apparatus in which the metal is softened or brought to the desired degree of plasticity for the welding or other metal working operation by an electric current applied thereto by suitable welding jaws or welding electrodes or other devices constituting electrodes through which heating current is supplied to the section of work to be heated, suitable means being employed for applying pressure to the heated work or otherwise operating upon it mechanically and also, if desired, for supporting or holding the work on or independent of the electrodes. It comprises a current supplying bar provided with arms terminating in electrodes for different pieces or portions of work, said arms having values of inductance adjusted to distribute the current to the work in the desired proportions.

1,012,871—David H. Lentz, Chicago, improvements in process of balling scrap metal. This invention relates to a new and improved process of welding scrap metal into relatively solid bodies of iron, especially in such a process for directly welding a mass of scrap metal into a substantially homogeneous body of iron of a character suitable for immediately forming into a bloom or billet and, in the preferred practice of the process, this is accomplished by "balling" the scrap metal, that is, by automatically welding it directly into a substantially homogeneous, roughly spherical body of a cahracter, density and form suitable for directly forming into a bloom or billet of any required size by treatment in a "squeezer" and rolls in a familiar manner. Especially is the new process adapted for rapidly bringing about this result with charges composed of scraps of iron of varying sizes and weight, without previous cleaning. It consists in subjecting the scrap to a preheating operation and thereupon introducing the scrap so heated, and in a loose mass into a zone of welding temperature and there welding the same into a ball.

The following patents granted to December 19, are reported expressly for the INDUSTRIAL WORLD, by J. M. Nesbit, patent attorney, Park building, Pittsburgh, from whom printed copies may be procured for 15 cents each:

Valve for blowing engines, Lorenz Iversen, West Homestead, Pa.; coke oven, William Fricks, Bethlehem, Pa.; coke oven or gas furnace, William Fricks, Bethlehem, Pa.; spacing table, Einar Molmark, Ambridge, Pa.; coating of metal articles (2), U. S. Armstrong, New Kensington, Pa.; rotary explosive engine, W. P. Barclay, Chicago; ammonia generator, A. E. Bosse, Pittsburgh, assignor to Acme Refrigerating Company; reversible valve gear, O. T. Issacson, Champaign, Ill.; process of operating gas producers, Charles Barmore, Jr., Paterson, N. J., assignor to Improved Equipment Company, New York; rotary motor, W. A. Ragsdale, Tie Plant, Miss.; coke screen and conveyor, T. J. Mitchell and J. A. McCreary, Uniontown, Pa.; furnace charging apparatus, C. E. Bedell, Warwood, W. Va.; furnace, T. S. Blair, Jr., Elmhurst, Ill., assignor to Blair Engineering Company, New York; annealing box, (2) Frank Cordes, Hulton Station, Pa., assignor to United Engineering & Foundry Company, Pittsburgh; manufacture of iron and steel, F. A. Wilmont, Bridgeport, Conn.; mandrel for rolling mills, Richard Muhe, Bous-on-the-Saar, Germany; cup vending machine. Rolland Robbins, Crafton, Pa., assignor to the Sanitary Fountain & Vending Machine Company, Pittsburgh; apparatus for purifying furnace gases, Utely Wedge, Ardmore, Pa.; manufacture of hollow wall vessels, O. J. W. Higbee, Pittsburgh.

FENCING MATERIAL IN NEW ZEALAND.

[Report from Vice Consul Henry D. Baker, Specially Detailed by Bureau of Manufactures.]

New Zealand as a market for fencing wire appears to offer increasing opportunities for American trade. The important demand is shown by imports in 1910 of plain fencing wire to the value of $574,976, barbed fencing wire $296,798, wire netting $252,338, and fencing staples $61,356. There were large increases over the preceding year, the United States showing good participation in such increases, as indicated by the following comparative summary of imports from different countries:

Countries.	Plain Fencing Wire 1909 Tons	1910 Tons
United States	3,000	4,108
United Kingdom	4,887	6,672
Australia	11	18
Canada	...	50
Germany	736	907
Belgium	95	64
Sweden	....	....
Total	8,737	11,819

The imports of wire netting are practically all from the United Kingdom. They showed an increased value of $82,328 in 1910 over 1909.

It will be noticed from the above table that imports of plain and barbed fencing wire from the United States were about one-third larger in 1910 than in 1909, and that the imports of fencing staples from the United States were in 1910 almost double what they were during the previous year; in fact, in 1910 they were greater than the total imports from all countries in 1909. The value of the plain fencing wire imported from the United States in 1910 was $192,500, as against $130,753 the previous year; of barbed wire $120,015, as against $78,343; and of fencing staples $46,481, as against $25,077.

Market Opportunities.

The United States enjoys equal opportunity with other countries, including other parts of the British Empire, as regards the New Zealand market for fencing wire, as metal wire of all kinds, including plain and barbed wire and fencing wire, as metal wire of all kinds, fencing staples, is admitted free into New Zealand, and there is no preferential surtax to handicap American trade, as there is on most classes of goods imported into New Zealand. There is, however, a preferential surtax of 10 per cent ad valorem on all metal woven wire, metal gauze, wire netting, and expanded metal lathing or fencing, in the piece, such goods being admitted from British

countries free. The preferential surtax of 10 per cent favoring British wire netting does not alone account for the absence of American trade in this important line.

In Australia where hundreds of miles of wire netting, as a protection against the rabbit pest, are used every year, wire netting is admitted free from all countries ,and yet this market has also been neglected by American wire manufacturers. Generally speaking, American manufacturers produce goods such as are needed at home, and when they have a surplus suitable for use in other countries they are glad to go in for export business, but as yet they do not seem to see advantage in making an article, such as wire netting, especially suitable for enormous uses in Australia and New Zealand to contend with rabbits, but which has comparatively little use at home. The English manufacturers, however, have made a very important specialty of wire netting to meet the extraordinary demand from Australasia.

Many Fences Being Built.

The rapidly increasing uses of fencing wire in New Zealand are due to closer settlement and also to improved methods of working the land. The larger holdings of land are being gradually subdivided into farms, which have to be managed with skill and economy in order to make them pay, and such careful management necessitates large use of fencing wire for subdividing the farm into small paddocks so that stock can be confined in one paddock and then another and not be allowed to graze wastefully over a large area, so that no part of the land gets sufficient rest and opportunity for recovery.

In sheep farming, for instance, the most important occupation in New Zealand, the sheep when raised primarily for their carcasses, are fattened on sown grasses or on root crops, chiefly turnips, and it is necessary to restrict them to one paddock at a time, or otherwise there would not be a proper chance for the grasses and roots to grow, and there would be a wasteful consumption of feed, especially in the case of turnips, mangos, etc., which the sheep would nibble off and spoil, but only partially eat, if not forced by the fences to make economical use of one paddock before being allowed into another. The New Zealand farmers are recognizing more and more the necessity of growing winter feed for sheep and cattle so that they may not lose condition during the winter, and of course the more they go in for such special winter feeding the greater is the need of fencing for partitioning off their farms.

Scarcity of Wood.

Increasing scarcity of timber through the agricultural and pastoral districts of New Zealand is lessening the use of wooden post and rail fences, and is causing an effort at greater economy in wooden posts for wire fences. Originally in the North Island, most of the land now used for grazing and agriculture was covered with a dense growth of timber, most of which was burned down, but a good deal was saved for fences. As these wooden fences subsequently decayed with age it has been found necessary to replace them, and timber now being scarcer and more valuable, the advantages of wire fencing have come more to the attention of farmers, and in most districts it is now admitted that wire answers the purpose better, and being more durable is cheaper in the end than wooden rails.

The pastoral and agricultural areas of the South Island, unlike those in the North Island, never were extensively timbered, and when the treeless plains of this part of New Zealand began to be sub-divided into sheep farms, and the farms into paddocks, the first partitioning was accomplished by hedges of gorse introduced from Scotland, the original home of most of the settlers of the South Island. These gorse hedges, with their bright yellow flowers, create an extremely picturesque effect in the country districts of New Zealand where they are used; but unfortunately it is difficult to prevent the gorse spreading from the hedges over the surrounding pastures, and once it gets out of control, it is one of the most troublesome weeds with which New Zealand farmers have to contend. Moreover, it is found that the gorse hedges make too good a cover for rabbits, Consequently, wire fences, less attractive in appearance, but more useful, are now rapidly superseding gorse hedges.

Character of Fences in Use.

There are many varieties of wire fences observable in the country districts of New Zealand, but the fences I have noticed most frequently have six plain wires and one barbed wire, the latter usually at the top so as to be effective for cattle, and not so low as to damage the fleeces of sheep, the barbs seldom being lower than the sheep's heads. Sheep farming in New Zealand is so commonly carried on in conjunction with cattle raising and dairying that the fences for the paddocks are ordinarily designed so as to be suitable for all kinds of stock.

Near the sea coast most of the fencing wire is galvanized, but in more inland and drier districts black varnished wire is more commonly used, of Nos. 8 to 10 gauge. In order to economize posts, the wires are held together at convenient distances by wooden or steel "droppers" which prevent animals being able to find space midway between the posts sufficient to get through. These "droppers" only just touch the ground

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and do not add strength to the fence, but they effect a great saving in the number of posts which would otherwise have to be used.

In many districts iron standards, some triangular, some T-shaped, of greater height than the posts, at intervals of perhaps 10 in a mile, are used for keeping the wires well stretched and strengthening the fence generally. For droppers and standards a good deal of iron is imported in lengths required, chiefly from Scotland, and the holes are punched in them at local factories. Most of the wire stretchers and strainers are made locally, selling for about $2.50 each.

Quality of Wire.

I have questioned a good many New Zealand farmers as to their opinions concerning the relative advantages or disadvantages of English, American, and German wire. It appears that English wire is usually considered somewhat better than American wire, though such a view may be inspired mostly by sentimental prejudice in favor of the home country. American wire is often criticized as being too brittle and hard to work, and, when tightly strained, apt to snap; but, on the other hand, it is conceded the merit of not stretching too much, and in price, which of course is a very important consideration, it is usually cheaper than English wire. Ordinarily American wire is preferred to German wire, as its quality is considered superior, though often German wire competes successfully with American wire on account of cheaper price.

There is close competition in the New Zealand wire market, and not only good wire, but good salesmanship and cheap prices are necessary for securing the trade. At present there are strong indications that Canada may become a serious competitor of England, the United States, and Germany in the local wire market. The new subsidized steamship service from Montreal to New Zealand is assisting Canadian manufacturers in an effort to enter this market, and during the last month Canadian wire has been quoted at prices below American wire. It remains to be seen, however, whether such wire will be as satisfactory in appearance and utility as American wire, but at any rate it is probable that quite an important share of the imports in the future will be from Canada.

Future Trade Prospects.

The United States, being the original home of barbed wire, enjoys a reputation in this line that should continue to increase. Moreover, the local use of barbed wire is likely to increase proportionately more than plain wire, owing to the steady growth of the dairying industry and raising of large stock causing much land, which previously had been used mostly for sheep and fenced accordingly, to require in the future more barbed wire. A great deal of the land of New Zealand is now becoming too valuable for sheep raising, and is being used for cows instead.

A great deal of wire netting is sold in New Zealand, both for protection against rabbits and for enclosing lambs, pigs, and poultry, where ordinary wire fencing would be insufficient. There are a great many different styles of netting thus used, all of English manufacture. Sometimes there is a combination of 3-ply sheep netting, with a center strand at the top to keep the sheep or lambs in, and at the bottom a closer netting to keep the rabbits out.

The flax industry of New Zealand requires large quantities of wire during the process of drying the fibers, when they are hung over a single wire—galvanized No. 8 gauge—attached to posts, to be exposed to the sun. The hop industry in certain limited districts requires wire which is suspended from poles so that the hop vines can climb up.

Canada's Improvement Work on the "North Shore" of Lake Huron.

For the past two years Sarnia has been much concerned over a proposed winter harbor. The St. Clair river comes out of Lake Huron about two miles above Sarnia, where it is quite narrow and swift. Within a half mile it suddenly widens toward the Canadian side,, forming what is known as Sarnia Bay, which covers something over 300 acres. A year or two ago the Dominion government provided for a winter harbor for this bay, estimating the cost of dredging and docks at $140,000, and a small appropriation was voted to commence operations. For the last eight or ten months the citizens have been expectantly looking for actual work in this direction. Of late no action has been taken regarding the project and it seems not altogether improbable that the delay will be more or less indefinite.

The town authorities and the board of trade have just entered into a tentative agreement with an American brass company of Decatur, Ill., whereby this company agrees to establish a plant in this city, and after the company has expended a certain amount of money in the plant and employs regularly 150 men the town is to pay a bonus, all told, of $30,000. It is proposed to submit this proposition in the shape of a by-law to the people, and if carried this industry will in all probability come here.

Report by U. S. Consul Fred C. Slater, Sarnia, Ontario, Canada.

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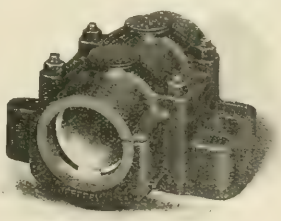

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R. R. ELECTRIFICATION IN NEW ZEALAND.

In a special report to the Bureau of Manufactures on Railway Development in New Zealand, United States Vice Consul Henry D. Baker, on special detail in that territory, says in a recent issue of the Bureau's Daily Consular Reports:

Program of Electrification.

The electrification of the railways of New Zealand in certain sections is now under contemplation by the government, especially where there are long tunnels, such as one between Christchurch and Lyttleton, now the longest in the Dominion (1¼ miles long), and at the Otira tunnel (as already explained) and at the Rimutaka incline, between Wellington and Napier in the North Island, where there is a grade averaging one foot in every three feet, requiring two or three engines for hauling trains up the incline. In the public works statement just presented to Parliament, it is stated:

The conditions pertaining to electrification of the Christchurch-Lyttleton railway are being investigated, and the requirements ascertained. It is anticipated that with a supply of power available from Lake Coleridge [see reports on water power development in New Zealand in Daily Consular Reports for September 12 and November 2, 1911] the conversion from steam to electric working will be profitable, and tenders for the work will be invited in due course with a view to its completion as soon as possible after the supply of current becomes available.

After the application of electricity to the working of this line, its application to other sections will be considered. In the meantime all information on the subject is being collated, and the progress of electrification of railways in other countries is being carefully watched. In view of the rapid extension of electric working in France, Germany, Switzerland, Norway, United States, and England, it is intended to make a systematic study of the traffic and train movements throughout the Dominion to ascertain definitely the power requirements of different sections. In other countries the electric working of railways, which has previously been limited to surburban service, is now being extended to main and branch lines, not only where the traffic is heavy, but also on lines with a comparatively infrequent service.

The department is consequently studying the application of electricity not only to suburban services, where its usefulness is undoubted, but also as an alternative to regrading, which is proving

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necessary on the main lines in order to cope with the increasing traffic.

Home Construction of Rolling Stock.

It is now the policy of the New Zealand government to make all its own roliing stock, even though it is admitted that it costs about one-third more to do so than if such equipment were imported from England or the United States. The present styles of locally made rolling stock conform to American patterns rather than British. On account of the narrow gauge of New Zealand railways —3 feet 6 inches—the locomotives and cars must be built much narrower than those intended for use on American railways, and this has led to some original local designs for economy of space.

The chief mechanical engineer of the New Zealand railways (Mr. A. L. Beattie), whose position corresponds with that of motive power superintendent on American railways, is a member of the American Railway Master Mechanics' Association, and is a strong advocate of American models for locomotives and cars. Mr. Beattie tells me that were it not the present government policy to make its own equipment, he would favor importing all the rolling stock for New Zealand railways from the United States, as American-built equipment previously bought has given much more satisfaction than that bought in England. Out of 478 locomotives now in use on the New Zealand railways, 109 were built in the United States and about 300 in England, the remainder having been built in New Zealand during the last four or five years, chiefly according to American designs modified to suit local conditions. Out of 1,166 cars used on the New Zealand railways about 100 were American built. The only imported parts of the present locally made equipment consist of the steel tires or rims for the wheels and the larger steel castings.

Shops and the Devices Used.

The chief local workshops for making this equipment are at Addington, a suburb of Christchurch. These is a large use here of machine tools and lathes, mostly from the United States, and much attention is paid to the latest American improvements with a view to their introduction here. Westinghouse airbrakes are used and the Pintsch system of car lighting. There are five separate Pintsch gas works manufacturing oil gas, the amount used by the government railways in 1910 being 8,270,930 cubic feet, costlng about 50 cents per 100 cubic feet. The cars are now nearly all fitted with incandescent mantles. Acetylene gas, generated from calcium carbide imported from the United States, is used for the locomotive headlights.

During last year nearly 1,000 car axles were replaced with modern steel axles, increasing their carrying capacity by about two tons each. The Norwegian center coupling system is in use here, although it is recognized that it would be better to use American standard vertical system.

Superheated Steam in Scotland.

It is stated by the London "Times" in a recent issue of its Engineering Supplement, that all the Scottish railway companies have now experimented with superheated steam on locomotives, and have decided that the system is a great improvement. The Caledonian Railway began about two years ago, when they fitted the Schmidt apparatus on a four-coupled passenger express engine. The trials were satisfactory, and four adidtional engines of the same type were fitted similarly. Now the company are running seven engines with superheated steam, two are being fitted, and four new engines are to be equipped with the apparatus. They have found that the working pressure can be reduced from 180 pounds and 200 pounds to 160 pounds and 165 pounds. In the earlier engines fitted the cylinders have been increased from 19 inches in diameter to 20 inches, while in the later locomotives the diameter is 21 inches.

The North British Railway Company are equipping four of their express locomotives with superheating apparatus. Two have been running for some time with the Phoenix or "smokebox" type, and two new 4-4-0 engines of the "Walter Scott" class will have the Schmidt type. Recently the Highland Railway Company have built a locomotive fitted with the Phoenix superheater, but it has not yet been in service. The Great North of Scotland Company are also making arrangements for giving superheated steam a trial.

It is interesting to note, in this connection, that the Scottish companies are restricting the use of superheated steam, for the present at least, to main line focomotives, as they believe that the best results are obtained on long distance runs.

Steel Building for Turkey.

What is said to be the first steel fireproof building ever put up in or around Constantinople is about to be erected by Robert College, the non-sectarian institution established several years ago overlooking the Bosphorus, about six miles from the Turkish capital. All of the steel material, even to the bolts and rivets, has been manufactured in this country by the American Bridge Company and shipped to Turkey within the last fe wmonths.

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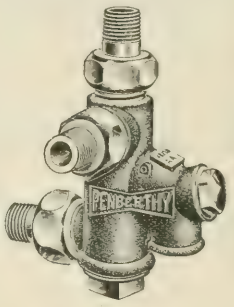

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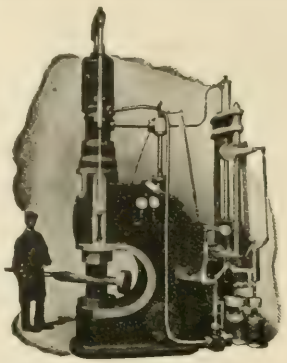

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BATTERY CHARGING RHEOSTATS
Cutler-Hammer Mfg. Co.....Milwaukee

BEAMS.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

BELLS and GONGS (Seamless Steel.)
National Tube Company .....Pittsburgh

BELTING.
Baird Machinery Co.....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Oswald, R. W. .....Pittsburgh

BELT CONVEYORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BENDING MACHINES-HYDRAULIC
Chambersburg Engineering Company .....Chambersburg, Pa.
Standard Bridge Tool Co.....Pittsburgh

BENDING ROLLS.
Standard Bridge Tool Co.....Pittsburgh

BLAST FURNACE BRICK.
Stowe-Fuller Co. .....Cleveland, O.

BLAST FURNACES.
Riter-Conley Mfg. Co. .....Pittsburgh

BLOWER REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

BLOWING ENGINES.
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

BLAST FURNACE BRICK.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa.

BOILERS.
H. J. Koontz .....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

BOILER FITTINGS.
National Tube Company .....Pittsburgh

BOILER TUBES.
National Tube Company .....Pittsburgh

BOILER SETTINGS.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa.

BORING MACHINES.
Baird Machinery Co.....Pittsburgh

BRAKES (Electric.)
Cutler-Hammer Mfg. Co.....Milwaukee

BRAKE SOLENOIDS.
Cutler-Hammer Mfg. Co.....Milwaukee

BRASS AND BRONZE CASTINGS.
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

BRAZING.
Linde Air Products Co., The.....
.....Buffalo, N. Y.

BRIDGE AND STRUCTURAL WORK
Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

BRIDGE BUILDERS.
Riter-Conley Mfg. Co. .....Pittsburgh

BUCKETS.
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.

BUCKETS (Coal.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUCKETS (Ore.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUCKETS (Self Filling.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

BUILDING BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

CAR FORGINGS.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Phillips Mine & Mill Supply Company .....Pittsburgh

CAR HAULS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CARRIERS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CARS (Industrial).
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CASTINGS.
Chambersburg Engineering Company .....Chambersburg, Pa.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Mackintosh, Hemphill & Co...Pittsburgh
McLanahan Stone Machine Company .....Hollidaysburg, Pa.
Mesta Machine Company ....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh
Wheeling Mould & Fdry. Co...Wheeling
Wm. Swindell & Bros. .....Pittsburgh

CASTINGS (Malleable.)
Jeffrey Manufacturing Co..Columbus, O.

CEMENT HANDLING MACHINERY
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CENTRAL CONDENSERS.
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

CHAIN BELTING.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
McLanahan Stone Machine Company .....Hollidaysburg, Pa.

CHAIN DRIVES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAIN HOISTS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Jones & Laughlin Steel Co....Pittsburgh
Link-Belt Company .....Philadelphia

CHAINS (Dodge, Ewart, Ley, Monobar, Maximum, etc.)
Link-Belt Company .....Philadelphia

CHAIN SLINGS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CHAIN GRATES.
American Stoker Co. .....New York

CHANNELS.
Carnegie Steel Company .....Pittsburgh
Jones & Laughlin Steel Co....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

CHEMISTS.
Gulick-Henderson Co. .....Pittsburgh

CHROME BRICK.
Stowe-Fuller Co. .....Cleveland, O.

CIRCUIT BREAKERS.
Stowe-Fuller Co. .....Cleveland, O.

CLAPPER TYPE SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

CLAY MACHINERY.
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Philips & McLaren Co. .....Pittsburgh

CLUTCH (Magnetic.)
Cutler-Hammer Mfg. Co.....Milwaukee

COAL.
Pittsburgh-Buffalo Co. .....Pittsburgh

COAL AND ASH HANDLING MACHINERY.
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CUTTING.
(Sprues and Risers off Castings.)
Linde Air Products Co., The.....
.....Buffalo, N. Y.

COAL CUTTERS.
Jeffrey Manufacturing Co..Columbus, O.

COAL DEALERS' SUPPLIES.
Standard Scale & Supply Co...Pittsburgh

COAL HAULING TIPPLES, MINING, WASHING & CRUSHING PLANTS.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

COAL AND ORE BRIDGE CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

COCKS.
National Tube Company .....Pittsburgh

COCKS (Iron Body and "High-Duty-Metal.")
National Tube Company .....Pittsburgh

COKE.
Bessemer Coke Co.....Pittsburgh
McKeefrey & Co. .....Leetonia, O.
Pittsburgh-Buffalo Co. .....Pittsburgh
Rogers, Brown & Co.....Cincinnati, O.
Skinner & Company, Inc.....Pittsburgh

COKE CHARGING CARS.
Jeffrey Manufacturing Co..Columbus, O.

COLD DRAWN STEEL SHAFTING AND SHAPES.
Jones & Laughlin Steel Co....Pittsburgh
Standard Gauge Steel Company .....Beaver Falls, Pa.

COLUMNS.
Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
W. N. Kratzer & Co. .....Pittsburgh

CONCRETE MIXERS.
Standard Scale & Supply Co...Pittsburgh

CONCRETE REINFORCEMENT.
The Consolidated Expanded Metal Co.'s .....Pittsburgh

CONDENSERS.
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

CONNECTING RODS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

CONSULTING ENGINEERS.
Doubleday-Hill Electric Co..Pittsburgh.
Duff, Samuel E. .....Pittsburgh
Kennedy, Julian .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh
Standard Bridge Tool Co.....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

CONTRACTORS.
Geo. J. Hagan .....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

CONTROLLERS (Electric.)
Cutler-Hammer Mfg. Co.....Milwaukee
Otis Elevator Company .....Pittsburgh
Doubleday-Hill Electric Co..Pittsburgh.

CONVEYORS AND ELEVATORS.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Belt.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Flight.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYORS (Screw.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CONVEYING MACHINERY.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CORRUGATED IRON.
McCollough Iron Co..Wilmington, Del.

COUPLINGS.
National Tube Company .....Pittsburgh

COUPLINGS (Magnetic.)
Cutler-Hammer Mfg. Co.....Milwaukee

COUPLINGS (Wrought.)
National Tube Company .....Pittsburgh
Central Tube Co. .....Pittsburgh

CRANES.
Northern Eng. Works ...Detroit, Mich.

CRANE CONTROLLERS.
Cutler-Hammer Mfg. Co.....Milwaukee

CRANES—LOCOMOTIVE.
Brown Hoisting Mach. Co...Cleveland
H. J. Koontz .....Pittsburgh
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CRANES & HOISTING MACHINERY
Baird Machinery Co.....Pittsburgh
H. J. Koontz .....Pittsburgh
Industrial Works .....Bay City, Mich.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Northern Eng. Works ...Detroit, Mich.

CRANK SHAFTS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

CRANE UNLOADERS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

CRUCIBLE STEEL.
Wm. Jessop & Sons, Ltd.....New York

CRUCIBLE STEEL MELTING FURNACES.
Wm. Swindell & Bros. .....Pittsburgh

CUPOLA.
Northern Eng. Works ...Detroit, Mich.
Riter-Conley Mfg. Co. .....Pittsburgh

CUPOLA BLOCKS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.
United Fire Brick Co...Uniontown, Pa.
West Va. Fire Clay Mfg. Co..Pittsburgh

CUPOLA LININGS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. ....Cleveland, O.

CYLINDERS.
Mesta Machine Company ....Pittsburgh

DIE BLOCKS.
Heppenstall Forge & Knife Company .....Pittsburgh

DIRECT MOTOR DRIVES.
Crocker-Wheeler Co.....Ampere, N. J.

DISC BRAKES.
Cutler-Hammer Mfg. Co.....Milwaukee

DITCHERS.
Jeffrey Manufacturing Co..Columbus, O.

DREDGE CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DREDGES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DREDGING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.

DRILLS.
Jeffrey Manufacturing Co..Columbus, O.

DRILLS FOR COAL MINES.
Jeffrey Manufacturing Co..Columbus, O.

DRIVE CHAINS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

DRIVE WELL POINTS AND WELL SUPPLIES.
National Tube Company .....Pittsburgh

DOVETAIL ROLLS.
The Heinle Company .....Pittsburgh

DROP HAMMERS.
Chambersburg Engineering Company .....Chambersburg, Pa.

DYNAMO BRUSHES.
Cutler-Hammer Mfg. Co.....Milwaukee
Doubleday-Hill Electric Co..Pittsburgh.

DYNAMOS AND MOTORS.
Crocker-Wheeler Co.....Ampere, N. J.
H. J. Koontz .....Pittsburgh
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC HOISTS.
Northern Eng. Works ...Detroit, Mich.
Otis Elevator Company .....Pittsburgh

ELECTRIC LIGHTING MACHINERY
Crocker-Wheeler Co.....Ampere, N. J.
Southwark Foundry & Machine Company .....Philadelphia

ELECTRICAL REPAIRS.
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC LAMPS (Arc and Incandescent)
Doubleday-Hill Electric Co..Pittsburgh.

ELECTRIC LOCOMOTIVES.
Jeffrey Manufacturing Co..Columbus, O.
Northern Eng. Works ...Detroit, Mich.

ELECTRICAL SUPPLIES.
Doubleday-Hill Electric Company .... Pittsburgh, Pa.

ELEVATOR CONTROLLERS AND ACCESSORIES.
Cutler-Hammer Mfg. Co.....Milwaukee

ELEVATORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia
Northern Eng. Works ...Detroit, Mich.
Otis Elevator Company .....Pittsburgh

EMERY & CORUNDUM WHEELS.
Standard Scale & Supply Co...Pittsburgh

ENGINEERS.
Chambersburg Engineering Company .....Chambersburg, Pa.
Chester & Fleming .....Pittsburgh, Pa.
Duff, Samuel E. .....Pittsburgh
G. W. McClure Son & Co....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Kennedy, Julian .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh
Link-Belt Company .....Philadelphia
Morgan Construction Company..... .....Worcester, Mass.
The S. R. Smythe Co. .....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

ENGINEERS—INSPECTING.
Gulick-Henderson Co. .....Pittsburgh

ENGINEERS—LABORATORY.
Gulick-Henderson Co. .....Pittsburgh

ENGINEERS (Mechanical.)
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

ENGINES.
Oswald, R. W. .....Pittsburgh
Otis Elevator Company .....Pittsburgh

ENGINES (Steam.)
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
H. J. Koontz .....Pittsburgh
Mackintosh, Hemphill & Co...Pittsburgh
Mesta Machine Company ....Pittsburgh
Southwark Foundry & Machine Company .....Philadelphia

EQUALIZING GEARS.
Jeffrey Manufacturin~ Co..Columbus, O.
Link-Belt Company .....Philadelphia

EXPANDED METAL.
The Consolidated Expanded Metal Co.'s .....Pittsburgh

EXPANSION METAL.
National Tube Company .....Pittsburgh

FAN REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

FEED WATER HEATERS, FILTERS AND PURIFIERS.
H. J. Koontz .....Pittsburgh

FIELD REGULATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

FIRE ARCH BRICK.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Bickford Fire Brick Company..... .....Curwensville, Pa.
Stowe-Fuller Co. .....Cleveland, O.

FIRE BRICK AND CLAY.
Bickford Fire Brick Company..... .....Curwensville, Pa.
Clearfield Fire Brick Co...Clearfield, Pa.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Pittsburgh-Buffalo Co. .....Pittsburgh
Jos. Soisson Brick Co..Connellsville, Pa.
Sandy Ridge Fire Brick Company .....Sandy Ridge, Pa.
Stowe-Fuller Co. .....Cleveland, O.
United Fire Brick Co...Uniontown, Pa.
West Va. Fire Clay Mfg. Co..Pittsburgh

FIRE ESCAPES.
W. N. Kratzer & Co. .....Pittsburgh

FIRE PROOFING.
W. N. Kratzer & Co. .....Pittsburgh

FIRE PUMP STARTERS.
Cutler-Hammer Mfg. Co.....Milwaukee

FITTINGS.
National Tube Company .....Pittsburgh

FITTINGS (Malleable and Cast Iron.)
National Tube Company .....Pittsburgh

FLAG STAFFS.
National Tube Company .....Pittsburgh

FLANGES (Cast and Malleable.)
National Tube Company .....Pittsburgh

FLATS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

FLANGING CLAMPS.
Chambersburg Engineering Company .....Chambersburg, Pa.
Standard Bridge Tool Co.....Pittsburgh

FLANGING.
Knox Pressed & Welded Steel Company .....Pittsburgh

FINISHED MACHINE KEYS.
Standard Gauge Steel Company .....Beaver Falls, Pa.

FLIGHT CONVEYORS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

FLOAT SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

FORGE AND FURNACE LININGS.
Bickford Fire Brick Company..... .....Curwensville, Pa.

FORGINGS.
Carnegie Steel Company .....Pittsburgh
Heppenstall Forge & Knife Company .....Pittsburgh
Jeffrey Manufacturing Co..Columbus, O.
Mesta Machine Company ....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

FORGINGS PRESSES.
Chambersburg Engineering Company .....Chambersburg, Pa.
Mesta Machine Co. .....Pittsburgh
United Eng. & Fdry Co.....Pittsburgh

FOUNDRY EQUIPMENTS.
Baird Machinery Co.....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

FOUNDRY FIRE BRICK.
Bickford Fire Brick Company..... .....Curwensville, Pa.
Dover Fire Brick Co.....Cleveland, O.
Kier Fire Brick Company ....Pittsburgh
Stowe-Fuller Co. .....Cleveland, O.

FRICTION CLUTCHES.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

FURNACES.
American Stoker Co. .....New York

FURNACE BUILDERS.
Laughlin, Alex & Co. .....Pittsburgh
Geo. J. Hagan .....Pittsburgh
G. W. McClure Son & Co....Pittsburgh
Kennedy, Julian .....Pittsburgh
Morgan Construction Company..... .....Worcester, Mass.
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

GALVANIZED SHEETS.
McCollough Iron Co..Wilmington, Del.

GAS AND GASOLINE ENGINES.
Standard Scale & Supply Co...Pittsburgh

GAS ENGINES.
Mesta Machine Company ....Pittsburgh

GAS PRODUCERS.
Geo. J. Hagan .....Pittsburgh
Laughlin, Alex & Co. .....Pittsburgh.
Morgan Construction Company..... .....Worcester, Mass.
Riter-Conley Mfg. Co. .....Pittsburgh
The S. R. Smythe Co. .....Pittsburgh
Wm. Swindell & Bros. .....Pittsburgh

GATE VALVES.
National Tube Company .....Pittsburgh

GEARING (Bevel, Mitre, Spur, etc.)
Link-Belt Company .....Philadelphia

GEARS.
Jeffrey Manufacturing Co..Columbus, O.
Mesta Machine Company ....Pittsburgh

GENERATORS.
Crocker-Wheeler Co.....Ampere, N. J.
Doubleday-Hill Electric Co..Pittsburgh.

GERMAN SILVER
Shimer & Company, Inc.....Pittsburgh

GIRDERS.
DeMoines Bridge & Iron Company ..... DeMoines, Ia.

Jones & Laughlin Steel Co....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.
W. N. Kratzer & Co. .....Pittsburgh

GLOBE VALVES.
National Tube Company .....Pittsburgh

GRAB BUCKETS.
Jeffrey Manufacturing Co..Columbus, O

GRATES.
American Stoker Co. .....New York

GRAIN TANKS.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa

GROUND FIRE CLAY.
West Va. Fire Clay Mfg. Co..Pittsburgh

GUILLOTINE SHEARS.
Standard Bridge Tool Co.....Pittsburgh

HEAD FRAMES.
Riter-Conley Mfg. Co. .....Pittsburgh

HIGH SPEED PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

HOISTING ENGINES.
Otis Elevator Company .....Pittsburgh

HORIZONTAL DRILLS.
Baird Machinery Co.....Pittsburgh

HORIZONTAL PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

HOT BLAST STOVE BRICK.
Stowe-Fuller Co. .....Cleveland, O.

HOT BLAST STOVES.
Bickford Fire Brick Company..... .....Curwensville, Pa.
G. W. McClure Son & Co....Pittsburgh

HOT METAL CARS.
Meehan Boiler & Con. Co..Lowellville,O.

HYDRAULIC ENGINEERS.
Chester & Fleming .....Pittsburgh, Pa.

HYDRAULIC MACHINERY.
Baird Machinery Co.....Pittsburgh
Chambersburg Engineering Company .....Chambersburg, Pa.
Mesta Machine Company ....Pittsburgh

HYDRAULIC PUMPS.
Chambersburg Engineering Company .....Chambersburg, Pa.

HYDRAULIC VALVES AND FITTINGS.
Chambersburg Engineering Company .....Chambersburg, Pa.
National Tube Company .....Pittsburgh

INJECTORS—AUTOMATIC.
Penberthy Injector Co. ..Detroit, Mich

ICE TOOLS.
Standard Scale & Supply Co...Pittsburgh

IGNITION BATTERY RHEOSTATS.
Cutler-Hammer Mfg. Co.....Milwaukee

INDUSTRIAL RAILWAYS.
Link-Belt Company .....Philadelphia

INSPECTION.
The Heinle Company .....Pittsburgh
Gulick-Henderson Co. .....Pittsburgh

IRON AND STEEL BARS.
Jones & Laughlin Steel Co....Pittsburgh

IRON FENCING.
W. N. Kratzer & Co. .....Pittsburgh

IRON ROOFS AND BUILDINGS.
Riter-Conley Mfg. Co. .....Pittsburgh
W. N. Kratzer & Co. .....Pittsburgh

"KEWANEE" UNIONS & SPECIALTIES.
National Tube Company .....Pittsburgh

LADLES.
Knox Pressed & Welded Steel Company .....Pittsburgh
Meehan Boiler & Con. Co..Lowellville,O.

LADLE BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

LADLE LININGS.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.

LATHES.
Baird Machinery Co.....Pittsburgh

LIFTING MAGNETS.
Cutler-Hammer Mfg. Co.....Milwaukee

LIMIT SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

LINK-BELTING.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

LOCOMOTIVE CRANES.
Industrial Works .....Bay City, Mich.
Link-Belt Company .....Philadelphia

LOCOMOTIVE FIRE BRICK
Bickford Fire Brick Company..... .....Curwensville, Pa.
Dover Fire Brick Co.....Cleveland, O.
Stowe-Fuller Co. .....Cleveland, O.

MACHINE BOLTS.
Riter-Conley Mfg. Co. .....Pittsburgh

MACHINE RACK.
Standard Gauge Steel Company .....Beaver Falls, Pa.

MACHINE TOOLS.
Baird Machinery Co.....Pittsburgh
H. J. Koontz .....Pittsburgh.

MACHINERY CASTINGS.
Wm. Swindell & Bros. .....Pittsburgh

MAGNESIA BRICK.
Stowe-Fuller Co. .....Cleveland, O.

MAGNESITE.
Stowe-Fuller Co. .....Cleveland, O.

MAGNETIC CLUTCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

MAGNETIC SEPARATORS.
Cutler-Hammer Mfg. Co.....Milwaukee

MAGNETIC (Electric Lifting.)
Cutler-Hammer Mfg. Co.....Milwaukee

MALLEABLE CASTINGS.
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

MASTER SWITCHES.
Cutler-Hammer Mfg. Co.....Milwaukee

MAXIMUM SILENT CHAIN.
Link-Belt Company .....Philadelphia

METAL CONFORMATION.
The Heinle Company .....Pittsburgh

METALLURGISTTS.
Gulick-Henderson Co. .....Pittsburgh

MILLING MACHINES.
Baird Machinery Co.....Pittsburgh
Standard Bridge Tool Co.....Pittsburgh

MINE FANS.
Jeffrey Manufacturing Co..Columbus, O.

MINING MACHINERY & SUPPLIES.
C. O. Bartlett & Snow Co.....Cleveland
Connellsville Mfg. & Mine Supply Company .....Connellsville, Pa.
Doubleday-Hill Electric Co..Pittsburgh.
Jeffrey Manufacturing Co..Columbus, O.
Meehan Boiler & Con. Co..Lowellville,O.
Phillips Mine & Mill Supply Company .....Pittsburgh

MOTORS.
Crocker-Wheeler Co.....Ampere, N. J.
Doubleday-Hill Electric Co..Pittsburgh.

MONEL METAL.
Shimer & Company, Inc.....Pittsburgh

MULTIPLE PUNCHES.
Standard Bridge Tool Co.....Pittsburgh

OIL REFINERY WORK.
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa

ORE CARS.
Jeffrey Manufacturing Co..Columbus, O.

ORE CONCENTRATORS & SEPARATORS.
McLanahan Stone Machine Company .....Hollidaysburg, Pa.

ORE HANDLING MACHINERY.
C. O. Bartlett & Snow Co.....Cleveland
Jeffrey Manufacturing Co..Columbus, O.
Link-Belt Company .....Philadelphia

OXYGEN.
The Linde Air Products Co....Buffalo

OXY-ACETYLENE WELDING AND CUTTING APPARATUS.
The Linde Air Products Co....Buffalo

PATENTS.
J. M. Nesbit .....Pittsburgh
Siggers & Siggers..Washington, D. C.

PAVING BRICK.
West Va. Fire Clay Mfg. Co..Pittsburgh

PAVING BLOCK.
West Va. Fire Clay Mfg. Co..Pittsburgh

"PECK" CARRIERS.
Link-Belt Company .....Philadelphia

PENSTOCKS.
Riter-Conley Mfg. Co. .....Pittsburgh
Standard Steel Tank & Manufacturing Company .....Pittsburgh, Pa.
Knox Pressed & Welded Steel Company .....Pittsburgh

PHOSPHOR BRONZE.
Shimer & Company, Inc.....Pittsburgh

PIG METALS (ORES, etc.)
McKeefrey & Co. .....Leetonia, O.
Rogers, Brown & Co.....Cincinnati, O.

PIG IRON.
Shimer & Company, Inc.....Pittsburgh

PILE DRIVERS.
Industrial Works .....Bay City, Mich.

PILLAR CRANES.
Industrial Works .....Bay City, Mich.
Northern Eng. Works ...Detroit, Mich.

PIPE AND PIPE FITTINGS.
Central Tube Co. .....Pittsburgh
National Tube Company .....Pittsburgh
U. S. Cast Iron & Pipe Foundry Company .....Scottdale, Pa.

PIPE COILS.
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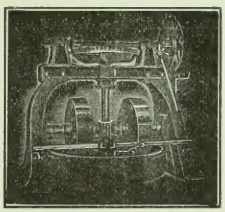

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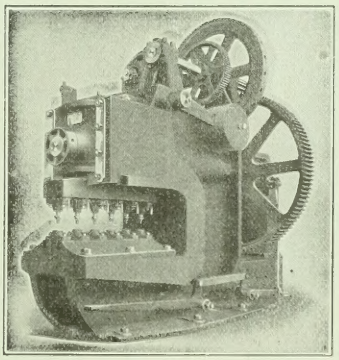

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